P r o g r a m m e

1st international Symposium

February 2 > 5 2009 - PARIS

Maison Internationale 17 bd Jourdan
75014 Paris, France
M° Cité Universitaire

www.symposiumcorot2009.fr

CENTRE NATIONAL D'ÉTUDES SPATIALES

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Useful information / Renseignements utiles

Maison Internationale
17 Boulevard Jourdan
75014 Paris, France
Station « Cité Universitaire » RER B

Opening times of the registration desk and the preview room / Horaires d'ouverture de l'accueil et de la salle de pré-projection

Monday 2 February to Wednesday 4 February: 8.30 - 18.15
Thursday 5 February: 8.30 - 16.15
The symposium registration desk is located in front of the room Adenauer (1st floor to the right). It is mandatory to wear your badge to enter the conference room.
L'accueil se situe devant le salon Adenauer (1er étage à droite). Le port du badge est obligatoire.

Registration fee (on site) / Droits d'inscription (sur place)

The on site registration fee is 300 €. It includes :
- your badge
- access to coffee breaks and lunches
- conference documents
- the congress dinner

Preview room / Salle de pré-projection

All speakers are kindly asked to download their powerpoint presentation in the preview room at least one hour before speaking. The preview room is located to the right of the conference room entrance.
Il est demandé aux orateurs de télécharger leur présentation PowerPoint en salle de pré projection au moins une heure avant leur passage sur scène. La salle de pré-projection est située à la droite de l'entrée à la salle de conférence.

CoRoT Exhibition / Exposition CoRoT

An exhibition about CoRoT will take place in the Auditorium wing.
Une exposition CoRoT se tiendra dans le foyer jouxtant la salle de conférence.

Coffee breaks and lunches / Déjeuners et pauses café

A welcome coffee will be held on Monday 2 February from 8.30 in the room Honnorat (in front of the conference room).
Un accueil café sera servi le Lundi 2 Février à partir de 8h30 dans le salon Honnorat (en face de la salle de conférence).
Coffee breaks and lunches will take place in the same room. (You can check the schedule in the synopsis).
Les pauses café et déjeuners seront situés dans la même salle (veuillez consulter les horaires sur le synopsis).

Cocktail Reception / Cocktail

All participants are invited to the cocktail reception offered by Thalès Alenia Space on Wednesday February 4 from 7.00 pm to 11.00 pm at the Paris Observatory (61 rue de l'Observatoire 75014 Paris).
L'ensemble des participants est invité au cocktail du congrès offert par Thalès Alenia Space le Mercredi 4 Février de 19h00 à 23h00 à l'Observatoire de Paris (accès par le 61 rue de l'Observatoire 75014 Paris).

Poster session / Session poster

Presenting authors of posters will be able to discuss their work during breaks and lunches from Monday 2 February to Thursday 5 February and during the posters highlights session from 14.00 to 15.30 on Thursday 5 February. (Honnorat room).
Les auteurs ayant soumis un poster pourront présenter leur travail pendant les pauses et les déjeuners du Lundi 2 Février au Jeudi 5 Février ainsi que durant la session poster le Jeudi 5 Février de 14h00 à 15h30. (salon Honnorat).

Internet

A free internet « wifi » access will be available in all the symposium rooms.
Un accès Internet wifi gratuit est mis à disposition dans l'ensemble des espaces de la Maison Internationale. login : COROT – password / *mot de passe* : 022009

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Synopsis

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Monday 2 February

- Registration and Welcome coffee
- Welcome addresses
- **Session Ia** – The CoRoT mission after 2 years in orbit
- **Session Ib** – The scientific context
- Lunch and Poster viewing
- **Session II** – Seismology of solar like stars
- Coffee Break and Poster viewing
- **Session III** – Detection of transits, methods and results

Tuesday 3 February

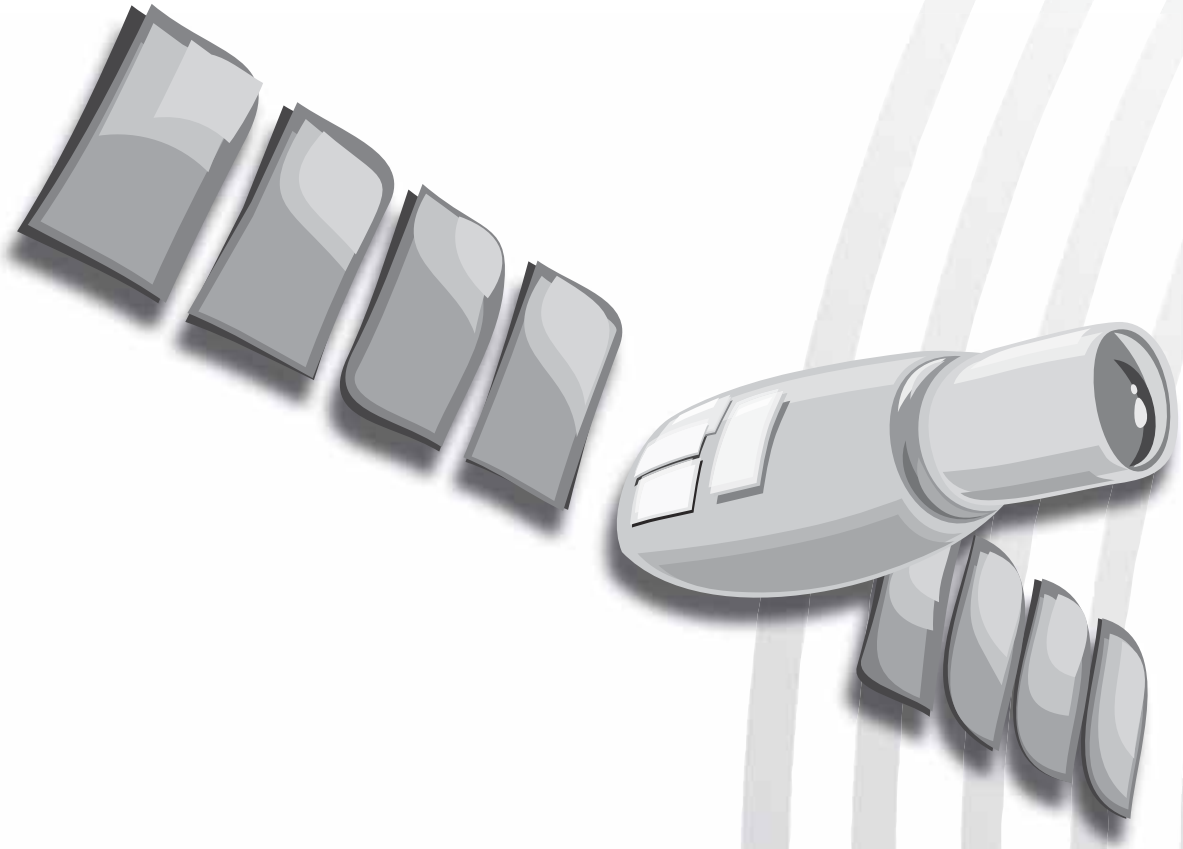
- **Session IV** – Seismology of intermediate mass stars
- Coffee Break and Poster viewing
- **Session V** – Planet confirmation, method and results
- Lunch and Poster viewing
- **Session VI** – Seismology of hot star
- Coffee Break and Poster viewing
- **Session VII** – Planets : theoretical interpretation

Wednesday 4 February

- **Session VIII** – Detailed analysis of light curves
- Coffee Break and Poster viewing
- **Session IX** – Binaries, classification of variables
- Lunch and Poster viewing
- **Session X** – Seismology of giant stars
- Coffee Break and Poster viewing
- **Session XI** – Françoise Praderie: from research to science policy
- Press Conference
- Reception *(Thalès AS)* at the Observatory

Thursday 5 February

- **Session XII** – Rotation, convection, activity
- Coffee Break and Poster viewing
- **Session XIII** – The successors of CoRoT
- Lunch
- **Session XIV** – Posters highlights
- Revelation of the micromagnitude revolution



Scientific programme

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Scientific Programme
Monday 2 February 2009

10:00 ▌10:30 Welcome addresses

10:30 ▌11:35 Session IA: **The CoRoT mission after 2 years in orbit**

10:30 Introduction to the symposium - *A. Baglin*

10:40 ▌ O-I-01 *INVITED TALK: O. VANDERMARCQ* - A journey in the exploitation of the CoRot system

11:10 ▌ O-I-02 *INVITED TALK: A. BAGLIN, E. MICHEL, P. BARGE, W. WEISS, M. DELEUIL, M. AUVERGNE* - What has been already observed

11:40 ▌13:00 Session IB: **The scientific context**

11:40 ▌ O-I-03 *INVITED TALK: C. TERQUEM* - Theories of formation and migration of planets

12:20 ▌ O-I-04 *INVITED TALK: J. P. ZAHN* - Asteroseismology: an irreplaceable tool to confront the great challenges of stellar physics

13:00 ▌14:00 Lunch and poster viewing

14:00 ▌15:45 Session II: **Seismology of solar like stars**

14:00 General introduction on the sismo programme

14:15 ▌ O-II-05 Solar-like oscillations in the F star HD 181420 as observed by CoRoT - *C. Barban, T. Appourchaux, E. Michel et al.*

14:30 ▌ O-II-06 Analysis of power spectra of sun-like stars using a Bayesian Approach - *T. Appourchaux*

14:45 ▌ O-II-07 Evidence of extra mixing from the seismic properties of the solar like star HD49933 - *M. J. Goupil, S. Deheuvels, A. Miglio et al.*

15:00 ▌ O-II-08 Thorough analysis of seismic properties of the solar-like CoRoT target HD49933 - *J. Montalban et al.*

15:15 ▌ O-II-09 Small separations and phase shift differences OF $=0,1$ Pmodes - *I. Roxburgh*

15:30 ▌ O-II-10 Monte Carlo Markov chains applied to stellar modelling - *M. Bazot*

15:45 ▌16:45 Coffee break and poster viewing

16:45 ▌18:15 Session III: **Detection of transits, methods and results**

16:45 General introduction on the exo programme

17:00 ▌ O-III-11 Transit detection in the CoRot light curves: an overview on methods and results - *P. Barge*

17:15 ▌ O-III-12 Planetary transit candidates in CoRoT-IRa01 field - *S. Carpano, J. Cabrera, R. Alonso et al.*

17:30 ▌ O-III-13 The CoRoT planetary transit detection threshold - *F. Pont*

17:45 ▌ O-III-14 Planetary transit discrimination with the help of color information in CoRoT light curves - *P. Bordé, B. Samuel, A. Léger et al.*

18:00 ▌ O-III-15 Assessing the confidence of low signal-to-noise transit candidates from CoRoT light curves - *B. Samuel, P. Bordé, A. Léger et al.*

Scientific Programme
Tuesday 3 February 2009

09:00 ▌10:30 Session IV: **Seismology of intermediate mass stars**

09:00 ▌ O-IV-16 HD181555 – What do first CoRoT data reveal about delta Scuti stars? - *E. Michel et al.*

09:15 ▌ O-IV-17 HD 50844: A new look to delta Scuti stars from space - *E. Poretti, E. Michel, R. Garrido et al.*

09:30 ▌ O-IV-18 Analysis and modelling of the delta Scuti stars HD 174966 and HD 174936 - *A. García Hernández, R. Garrido Haba, E. Michel et al.*

09:45 ▌ O-IV-19 Frequency analysis of the sismo field gamma Doradus star: HD 49434 - *P. Matthias et al.*

10:00 ▌ O-IV-20 Asteroseismology of intermediate-mass stars in NGC 2264 - first results - *K. Zwintz, A. Kaiser, M. Gruberbauer, et al.*

10:15 ▌ O-IV-21 Magnetic and chemical structure of the CoRoT CP target star HD 50773 - *T. Lueftinger, W. Weiss, M. Aurière et al.*

10:30 ▌11:00 Coffee break and poster viewing

11:00 ▌13:35 Session V: **Planet confirmation, method and results**

11:00 ▌ O-V-22a The smallest CoRot planet - *D. Rouan*

11:15 ▌ O-V-22b CoRoT's exoplanet harvest - *H. Rauer, M. Fridlund, the CEST*

11:40 ▌ O-V-23 Initial run of CoRoT: How we learned and what we learned - *C. Moutou, F. Pont, R. Alonso et al.*

11:55 ▌ O-V-24 The photometric follow-up of CoRoT planet candidates - *H. Deeg et al.*

12:10 ▌ O-V-25 Radial velocity follow-up of CoRoT candidates: strategy, facilities and results - *F. Bouchy, C. Moutou, D. Queloz et al.*

12:25 ▌ O-V-26 Spectroscopic analysis for the CoRoT planet host stars - *M. Deleuil, M. Fridlund, H. Bruntt et al.*

12:40 ▌ O-V-27 VLT high-precision transit photometry for CoRoT planets - *M. Gillon, D. Queloz, A. Triaud et al.*

12:55 ▌ O-V-28a Multi-object spectroscopy in the CoRoT LRa01 field: The stellar content in the anti-center direction - *D. Gandolfi, E. Guenther, M. Deleuil et al.*

13:10 ▌ O-V-28b Stellar populations of the observed CoRot exo-fields and for the field LRC03 - *M. Barbieri*

13:25 ▌ O-V-29 EXODAT: Exo-planets information system: Evolutions - *J. C. Meunier, M. Deleuil, F. Agneray, et al.*

13:35 ▌14:30 Lunch and poster viewing

14:30 ▌16:00 Session VI: **Seismology of hot stars**

14:30 ▌ O-VI-30 The beta Cephei star HD 180642: Full integration of CoRoT and ground data for mode identification - *M. Briquet, K. Uytterhoeven, C. Aerts et al.*

14:45 ▌ O-VI-31 The beta Cephei star HD 180642: Seismic modelling - *A. Thoul, M. Briquet, P. Degroote et al.*

15:00 ▌ O-VI-32 Seismic analysis of HD49330 from CoRoT and spectroscopic data - *A. L. Huat, A. M. Hubert, M. Floquet et al.*

15:15 ▌ O-VI-33 First seismic modeling of CoRoT BE stars - *C. Neiner, H. Saio, C. Lovekin, et al.*

15:30 ▌ O-VI-34 Mode identification in rapidly rotating stars - *D. Reese, M. Thompson, K. MacGregor et al.*

15:45 ▌ O-VI-35 Pulsating B stars in CoRoT's exofield data: discoveries, frequencies and general properties - *P. Degroote, A. Miglio, J. Debosscher et al.*

16:00 ▌16:45 Coffee break and poster viewing

16:45 ▌18:15 Session VII: **Planets: theoretical interpretation**

16:45 ▌ O-VII-36 The compositions of CoRoT's giant planets: Implications for planet formation - *T. Guillot, M. Havel, M. Ikoma et al.*

17:00 ▌ O-VII-37 Structure and evolution of the CoRoT exoplanets. Probing the Brown Dwarf - Planet overlaping domain - *J. Leconte, I. Baraffe, G. Chabrier*

17:15 ▌ O-VII-38 The mass loss boundary for hot gas giants: What can we learn from transit observations? *H. Lammer, K. Maxim, L. Herbert et al.*

17:30 ▌ O-VII-39 Planet formation by nucleated-instability: predictions for CoRoT - *Y. Alibert, F. Pont, I. Baraffe et al.*

17:45 ▌ O-VII-40 Planet formation and the CoRoT planet census - *G. Wuchterl*

18:00 ▌ O-VII-41 Structure and composition of super-earths - *D. Valencia*

09:00 ▌11:15 Session VIII: **Detailed analysis of light curves**

09:00 General introduction to the photometric performance - *M. Auvergne*

09:15 ▌ O-VIII-44 Noise in the CoRoT exo-fi eld lightcurves - *M. Ollivier, M. Auvergne, F. Fialho et al.*

09:30 ▌ O-VIII-42 Noise properties of the CoRoT exoplanet data - *S. Aigrain, F. Pont, F. Fressin*

09:45 ▌ O-VIII-43 Exoplanets channel point spread function estimation - *V. Parro, F. Fialho, L. Pinheiro et al.*

10:00 ▌ O-VIII-45 *INVITED TALK: E. AGOL* - Timing of transiting planets

10:30 ▌ O-VIII-46 Cleaning CoRoT lightcurves with Polyfi t and Sysrem - *T. Mazeh, S. Zucker, S. Aigrain et al.*

10:45 ▌ O-VIII-47 The secondary eclipse of CoRoT-exo-1b - *R. Alonso Sobrino, S. Aigrain*

11:00 ▌ O-VIII-48 Planet detection through the timing method - *R. Silvotti*

11:15 ▌11:45 Coffee break and poster viewing

11:45 ▌13:00 Session IX: **Binaries, classification of variables**

11:45 ▌ O-IX-49 Automated classification of light curves in the CoRoT exoplanet database. - *L. M. Sarro, J. Debosscher, M. Deleuil et al.*

12:00 ▌ O-IX-50 CoRoT additional programs on binary stars - *C. Maceroni, I. Ribas, P. Lampens, et al.*

12:15 ▌ O-IX-51 Properties of binary systems found in the CoRoT exoplanet search - *J. M. Almenara Villa, H. Deeg*

12:30 ▌ O-IX-52 Discovery of low-amplitude periodic variables with 0.1 millimag amplitude in CoRoT lightcurves - *T. Mazeh, S. Zucker, I. Ribas et al.*

12:45 ▌ O-IX-53 Possible detection of microlensing effect among CoRoT selected eclipsing binaries - *D. Ricci, J. Poels, C. Maceroni et al.*

13:00 ▌14:00 Lunch and poster viewing

14:00 ▌15:30 Session X: **Seismology of giant stars**

14:00 ▌ O-X-54 Solar-like oscillations in red giants observed with CoRoT - *J. De Ridder, T. Kallinger, C. Barban et al.*

14:15 ▌ O-X-55 Amplitudes of solar-like oscillations in red giants: comparison with an adiabatic scaling law - *R. Samadi, F. Baudin, C. Barban, et al.*

14:30 ▌ O-X-56 Theoretical amplitudes and life-times of non-radial solar like oscillations in red giants - *M. A. Dupret*

14:45 ▌ O-X-57 Inference from adiabatic analysis of solar-like oscillations in red giants - *A. Miglio et al.*

15:00 ▌ O-X-58 Exofield red giants: fundamental parameters and first results from asteroseismic modeling - *T. Kallinger, W. W. Weiss, S. Hekker et al.*

15:30 ▌16:30 Coffee break and poster viewing

16:30 ▌18:00 Session XI: **Francoise Praderie: from research to science policy**

16:30 ▌ O-XI-59 *INVITED TALK: C. CATALA* - Opening new ways in stellar physics

17:15 ▌ O-XI-60 *INVITED TALK: D. ALLOIN* - Building the national and European science policies

19:00 ▌ 23:00 Cocktail reception and Gala dinner **offered by Thalès Alenia Space at Paris Observatory**

Scientific Programme
Thursday 5 February 2009

09:00 ▌11:15 Session XII: **Rotation, Convection, Activity**

09:00 ▌ **O-XII-61** *INVITED TALK: M. GIAMPAPA* - COROT: A tool for stellar dynamo diagnostics

09:30 ▌ **O-XII-62** The enigmatic granulation background of HD49933 - *H. G. Ludwig, R. Samadi*

09:45 ▌ **O-XII-63** Rotation versus activity in CoRoT era - *J. do Nascimento, C. Cortés, L. P. de Souza Neto et al.*

10:00 ▌ **O-XII-64** A CoRoT observation of the star-forming region NGC 2264 - *F. Favata, G. Micela, S. Aigrain et al.*

10:15 ▌ **O-XII-65** Accretion dynamics and star-disk interaction in NCG2264 - *S. Alencar, J. Bouvier, C. Catala et al.*

10:30 ▌ **O-XII-66** Analysis of rotation of CoRoT Dwarf stars - *L. Affer, G. Micela, F. Favata et al.*

10:45 ▌ **O-XII-67** Photospheric activity and surface differential rotation in the Planet hosting stars CoRoT-exo_2A and CoRot-exo_4A - *A. F. Lanza, I. Pagano, G. Leto et al.*

11:00 ▌ **O-XII-68** CoRoT-exo-2A starspots physical characteristics - *A. Valio, A. F. Lanza, R. Alonso et al.*

11:15 ▌11:45 Coffee break and poster viewing

11:45 ▌13:15 Session XIII: **The successors of COROT**

11:45 ▌ **O-XIII-69** COROT2: a program for 3 more years - *A. Baglin*

12:00 ▌ **O-XIII-70** *INVITED TALK: J. MATTHEWS* - Most in the CoRoT era

12:15 ▌ **O-XIII-71** BRITE-constellation on the shoulders of CoRoT - *W. Weiss, A. Moffat, O. Kudelka*

12:25 ▌ **O-XIII-72** Planetary transits beyond CoRoT: The case for Dome C observations - *T. Guillot, K. Agabi, N. Crouzet et al.*

12:35 ▌ **O-XIII-73** *INVITED TALK: W.J. BORUCKI* - Kepler data validation and follow up programs

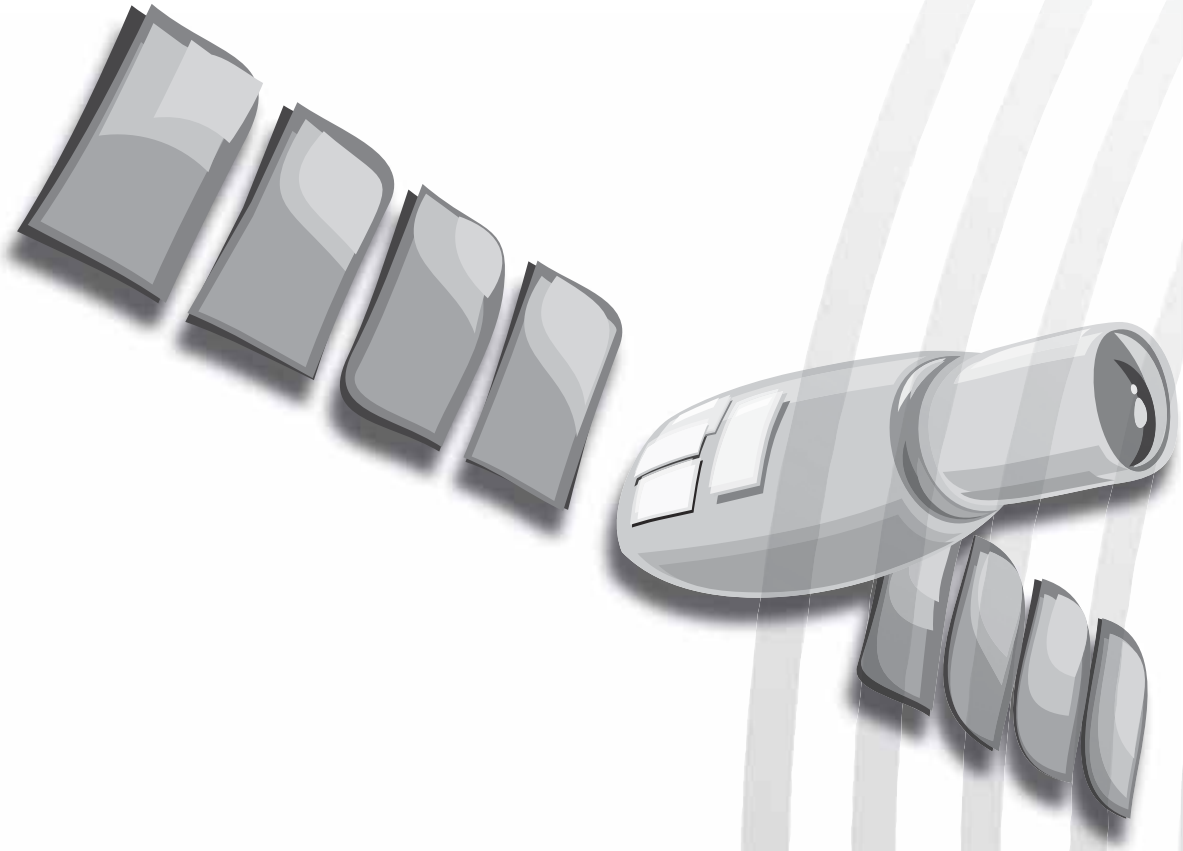
12:50 ▌ **O-XIII-74** *INVITED TALK: C. CATALA* - PLATO: Planetary Transits and Oscillations of stars

13:15 ▌14:00 Lunch and poster viewing

14:00 ▌15:30 Session XIV: **Poster highlights**

15:30 ▌16:00 Session XV: **Revelation of the micromagnitude revolution**

O-XV-75 Les révélations de la révolution : Revelations of the micromagnitude revolution (invited conference review) - *D Kurtz*



List of posters

SESSION I: **The COROT mission after 2 years in orbit**

P-I-001 New insight on photometric perturbations of CoRoT light curves. - *M. Auvergne (Meudon, France)*

P-I-002 From imagette to lightcurve: the exo-imagette pipeline - *R. den Hartog (Utrecht, The Netherlands), R. Cautain (Marseille, France), L. Jorda (Marseille, France), et al.*

P-I-003 A simulator of photometric surveys: application to corot in the exoplanet field - *N Crouzet, T Guillot (Nice, France)*

P-I-004 Development of a hybrid algorithm for time-resolved stellar photometry from space images *K. Iguchi, L. Pinheiro Da Silva, H. Y. Kim (Sao Paulo, Brazil), et al.*

P-I-005 The heritage of MOST: Novel data analysis techniques for space photometry - *P. Reegen (Vienna, Austria)*

P-I-006 CoRoT data production and distribution: past and future - *S. Chaintreuil, M. Bernard, R. Romagnan (Meudon, France)*

P-I-007 CoRoT data distribution - *H. Ballans*

P-I-008 The CoRoT Archive at CDS - *F. Ochsenbein, F. Genova (Strasbourg, France)*

P-I-009 The NASA Star and Exoplanet Database (NStED) - *D. R. Ciardi (Pasadena, USA)*

P-I-010 The COROT Public Archive at LAEFF - *E. Solano, A. Velasco, R. Gutiérrez, M. López, M. Garcia Torres (Madrid, Spain)*

SESSION II: **Seismology of solar like stars**

P-II-011 Search for second-order frequency variations in CoRoT data - *M. Bazot, M. J. P. F. G. Monteiro (Porto, Portugal)*

P-II-012 The HD49933 case - *B. Othman, T. Appourchaux, F. Baudin (Orsay, France)*

P-II-013 Bayesian approach for the identification of solar like star oscillations, with maximum a posterior - *P. Gaulme, T. Appourchaux (Orsay, France)*

P-II-014 Solar-like oscillations and activity in HD 175726 - *B. Mosser, M. Auvergne, A. Baglin (Meudon, France), et al.*

P-II-015 The Procyon Campaign: Frequency Analysis and Maximum Likelihood Estimation of Mode Parameters - *T. Campante (Porto, Portugal), H. Kjeldsen (Aarhus, Denmark), T. Bedding (Sidney, Australia), et al.*

P-II-016 P-mode characteristics of HD-181906 - *R. A. Garcia (Paris, France), C. Regulo (La Laguna, Spain), T. Appourchaux (Orsay, France), et al.*

P-II-017 Enhancing the signal-to-noise ratio of solar-like targets - *R. A. Garcia (Paris, France), J. Ballot (Toulouse, France), S. Mathur (Bangalore, India), et al.*

P-II-018 HD 49385: a cool solar-like star observed by CoRoT - *Sebastien Deheuvels, CoRoT Builders, DAT Team (Meudon, France)*

P-II-019 Modelling CoRoT's solar like stars - *Ian Roxburgh (London, UK)*

P-II-019b Time autocorrelation as a diagnostic of solar-like stars - *I. Roxburgh (London, UK)*

P-II-020 Accurate fundamental parameters of the CoRoT asteroseismic targets - *Hans Bruntt (Sydney, Australia)*

P-II-021 Which constraints can we set on the convective core of HD49933? - *V. Silva Aguirre (Muenchen , Germany), J. Ballot (Toulouse, France), A. Weiss (Muenchen , Germany)*

P-II-022 Interpretating the observations of HD49933 - *O. Creevey (La Laguna , Spain), M. Bazot (Porto, Portugal)*

P-II-023 Asteroseismic modelling of Procyon A based on recent frequency analyses - *G. Dogan (Aarhus, Denmark), A. Bonanno (Catania, Italy), T. Campante (Porto, Portugal), et al.*

P-II-024 Relative Weights of the Observational Constraints on the Determination of the Stellar Parameters - *N. Ozel, M.-A. Dupret, A. Baglin (Meudon, Paris)*

P-II-025 Asteroseismic modelling of beta Hydri - *I. Brandão (Porto, Portugal), G. Dogan (Aarhus, Denmark), T. Bedding (Sydney, Australia), et al.*

P-II-026 Dynamical modeling of asteroseismic targets combining 3d and 1d models - *L. Piau (Gif - sur - Yvette, France), R. Stein (East Lansing, USA), S. Mathis (Gif - sur - Yvette, France), et al.*

P-II-027 Exploration of parameter space for modeling CoRoT targets with CESAM/CLES codes - *Y. Lebreton (Meudon, France), J. Montalban (Liège, Belgium), A. Miglio (Liège, Belgium), et al.*

P-II-028 On extracting signatures of small convective cores from space-based data - *M. Cunha (Porto, Portugal), I. Brandão (Porto, Portugal), T. Metcalfe (Boulder, USA)*

P-II-029 MHD modelling of stellar interiors over secular time-scales - *V. Duez, S. Mathis, A. Sacha Brun (Gif-sur-Yvette, France), et al.*

P-II-030 New models for the CoRoT primary target HD 52265, including core overshooting - *M. Soriano, S. Vauclair (Toulouse, France)*

P-II-030b Numerical simulations of p-mode damping in main sequence stars - *F. Kupka, F. Zaussinger (Vienna, Austria)*

SESSION III: **Detection of transits, methods and results**

P-III-031 Improving transit search algorithms by appropriate prefiltering of CoRoT lightcurves - *J. Weingrill (Vienna, Austria), K. Maxim (Vienna, Austria), L. Helmut (Vienna, Austria), et al.*

P-III-32 An efficient algorithm for analysis of stellar light curves and detection of transits - *M. Khodachenko (Graz, Austria), A. Kislyakov (Nizhny Novgorod, Russia), J. Weingrill (Graz, Austria), et al.*

P-III-33 Searching For Trojan Asteroids In HD 209458 And Other Exoplanetary Systems - *R. Moldovan, J. Matthews, B. Gladman (Vancouver, Canada), et al.*

P-III-34 How can we detect planets in exchange orbits- *R. Dvorak (Vienna, Austria), J. Schneider (Meudon, France), V. Steinecker (Vienna, Austria)*

P-III-35 Performance of exotrans on CoRoT lightcurves - *L. Carone, S. Grziwa, M. Pätzold (Köln, Germany)*

P-III-36 Box Least Squares (BLS) As An Orbit-Fitting Algorithm - *A. Ofir (Tel Aviv, Israel)*

P-III-37 Transit color changes in CoRoT candidates - *B. Tingley, J. M. Almenara Villa, H. J. Deeg (La Laguna, Spain)*

P-III-38 Combining planetary transits with other detection methods - *J. Schneider (Meudon, France)*

P-III-39 Fitting Multi-Planet Transit Models to CoRoT Time-Data Series by Evolutionary Algorithms - *A. Chwatal (Vienna, Austria), G. Wuchterl (Tautenburg, Germany), G. Raidl (Vienna, Austria)*

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P-IV-40 The domain of delta Scuti stars: CoRoT IRa01 results - *A. Kaiser (Vienna, Austria), W. Werner (Vienna, Austria), I. Ribas (Bellaterra, Spain), et al.*

P-IV-41 Short run data analysis of two delta Scuti stars: HD174936 & HD174966 - *R. Garrido (Granada , Spain), E. Michel (Meudon, France), E. Poretti (Milano, Italy), et al.*

P-IV-42 Analysis of the delta scuti star HD49294 - *L. Lefevre, DAT TEAM, CoRoT Builders (Meudon, Paris)*

P-IV-43 HD172189: a further step to furnish one of the best laboratories known for asteroseismic studies - *O. Creevey (La Laguna, Spain), P. J. Amado (Granada, Spain), K. Uytterhoeven (La Laguna, Spain), et al.*

P-IV-44 Gamma doradus in the exoplanet fields: first inspection - *Thematic Team Gamma Doradus (Nice, France)*

P-IV-45 Theoretical gamma-Doradus instability strip and first comparisons with CoRoT data - *A. Miglio (Liège, Belgium), J. Montalban (Liège, Belgium), M.-P. Bouabid (Nice, France), et al.*

P-IV-46 Preliminary results for HgMn stars from CoRoT observations - *Georges Alecian (Meudon, France), M. Gebran (Barcelona, Spain), O. Richard (Montpellier, France)*

P-IV-47 The CoRoT CP Target Star HD 171586 - *T. Lueftinger, W. W. Weiss, T. Kallinger (Vienna, Austria), et al.*

P-IV-48 Pulsating Pre-Main-Sequence candidate stars in Dolidze 25 - *V. Ripepi, M. Marconi, A. Ruoppo (Naples, Italy), et al.*

P-IV-49 Evolutionary status determination from detection of NIR excesses in the SEDs - *D. Díaz, P. Amado, E. Rodríguez (Granada, Spain)*

SESSION V: **Planet confirmation, method and results**

P-V-50 Transiting exoplanets from the CoRoT space mission VIII CoRoT-Exo-6b: A giant planet in a 9d orbit - *M. Fridlund (Noordwijk, The Netherlands), G. Hebrard (Paris, France), R. Alonso (Marseille, France), et al.*

P-V-51 The transiting exoplanet CoRoT-Exo-5b - *H. Rauer (Berlin, Germany), D. Queloz (Geneva, Switzerland), Sz. Csizmadia (Berlin, Germany), et al.*

P-V-52 Characterisation of a Planet's Parameters using the Rossiter-McLaughlin Effect - *A. Triaud (Sauverny, Switzerland), D. Queloz (Sauverny, Switzerland), A. Collier Cameron (St Andrews, UK),*

P-V-53 Analysis of the CoRoT results: statistical study of the underlying planet population - *F. Fressin (Cambridge, USA), T. Guillot (Nice, France), F. Pont (Exeter, UK), et al.*

P-V-54 Hints for star-planet interaction in CoRoT-exo2a - *I. Pagano, A. F. Lanza, G. Leto (Catania, Italy), et al.*

P-V-55 Spectroscopic analysis of a large sample corot/exoplanet targets using the flames instrument - *J.-C. Gazzano, M. Deleuil, M. Barbieri (Marseille, France), et al.*

P-V-56 Selection of most promising candidates in the CoRoT mission for radial-velocity follow-up - *R. da Silva (Sao Jose dos Campos, Brazil), A. Silva-Valio (Sao Paulo, Brazil)*

P-V-57 Spectroscopic Determination of Physical Parameters of Stars in Planetary Systems - *E. Janot-Pacheco, P. Cruz (Sao Paulo, Brazil)*

P-V-58 Atmospheric study of the young CoRot-Exo-2b planet with Spitze - *B.-O. Demory, M. Gillon, D. Queloz, et al. (Geneva, Switzerland)*

P-V-59 Stellar metallicities and planet migration in CoRoT-exo systems - *R. de la Reza (Rio de Janeiro, Brazil), C. Chavero (Rio de Janeiro, Brazil), O. Cabo Winter (Guaratinguetá; Brazil), et al.*

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P-VI-060 The Asteroseismic Ground-based Observational Counterpart of CoRoT - *K. Uytterhoeven (Gif-sur-Yvette, France), E. Poretti (Merate, Italy), P. Mathias (Nice, France), et al.*

P-VI-61 Characterization of CoRoT variable stars with FLAMES and statiscal study of pulsations of Be stars - *T. Semaan*

P-VI-62 The Beta Cephei star HD 180642: analysis of the CoRoT light curve - *P. Degroote (Leuven, Belgium), M. Briquet (Leuven, Belgium), A. Thoul (Liège, Belgium),*

P-VI-63 Beta Cephei stars in the local part of the Galaxy - *A. Pigulski (Wroclaw, Poland), G. Pojmański (Warsaw, Poland)*

P-VI-64 A complex asteroseismic analysis of the Beta Cephei star Theta Ophiuchi - *J. Daszynska-Daszkiewicz (Wrocław, Poland)*

P-VI-65 GSC06272-01557, the first Beta Cephei star discovered with MOST - *V. Antoci, G. Handler, R. Kuschnig (Vienna, Austria), et al.*

P-VI-66 Time-frequency analysis of light curves of CoRoT be stars - *B. Leroy (Meudon, France), M. Emilio (Ponta Grossa, Brazil), Y. M. Kuzicz (Ponta Grossa, Brazil), et al.*

P-VI-67 Analysis of CoRoT Be Star 102761769 - *E. Janot-Pacheco (Sao Paulo, Brazil), M. Emilio (Ponta Grossa, Brazil)*

P-VI-68 Analysis of the Be stars 102964342, 102725623 and 102719279 observed in the exoplanet field of COROT - *J. Gutierrez-Soto (Meudon, France), P. Diago (Valencia, Spain), J. Fabregat (Valencia, Spain), et al.*

P-VI-69 Ground-based spectroscopic observations of the B0.5 IVe Be CoRoT target HD49330 - *Michele Floquet, A. L. Huat, A. M. Hubert (Meudon, France), et al.*

P-VI-70 HD50747 : Analysis of CoRoT data - *Noël Dolez (Toulouse, France), S. Vauclair (Toulouse, France), E. Michel (Meudon, France), et al.*

P-VI-71 The Be star HD 50209: results from the seismology field data - *P. D. Diago Nebot (Paterna , Spain), J. Gutiérrez-Soto (Meudon, France), J. Fabregat (Paterna, Spain),*

P-VI-72 A spectroscopic survey of B-type stars in the CoRoT fields - *E. Niemczura (Wroclaw, Poland), T Morel (Liege, Belgium), C. Aerts (Leuven, Belgium)*

P-VI-73 Pulsating B stars in CoRoT's exofield data: discoveries, frequencies and general properties - *P. Degroote (Leuven, Belgium), A. Miglio (Liege, Belgium), J. Debosscher (Leuven, Belgium), et al.*

P-VI-74 CoRoT's View on Strange-Mode Oscillations: the case of the B6I supergiant HD 50064 - *C. Aerts (Leuven, Belgium), A. Noels (Liege, Belgium), M.-A. Dupret (Meudon, France), et al.*

P-VI-75 Slowly pulsating B stars in the CoRoT SISMO fields - *A. Miglio (Liege, Belgium) et al.*

P-VI-76 Theoretical gamma-Doradus instability strip and first comparisons with CoRoT data - *A. Miglio (Liege, Belgium), J. Montalban (Liege, Belgium), M.-P. Bouabid (Nice, France), et al*

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P-VII-77 Cloud formation in the atmospheres of Brown Dwarfs and Giant Planets - *F. Allard, F. Bernd (Lyon, France)*

P-VII-78 Time-dependent radiative model for exoplanets atmosphere - *N. Iro (Greenbelt, USA)*

P-VII-79 Tidal interactions of CoRoT planets - *L. Carone, M. Pätzold (Köln, Germany)*

P-VII-80 Maximum embedded equilibrium masses for close-in giant planets - *C. Broeg (Bern, Switzerland), C. Mordasini (Heidelberg, Germany), G. Wuchterl (Tautenburg, Germany), et al.*

P-VII-81 Young Planetary Systems and the COROT Satellite - *E. Janot-Pacheco, T. Matheus (Sao Paulo, Brazil)*

P-VII-82 Candidate exoplanets to harbour extremophile life - *C. Lage (Rio de Janeiro, Brazil), I. Paulino-Lima (Rio de Janeiro, Brazil), E. Janot-Pacheco (Sao Paulo, Brazil)*

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P-VIII-83 Search for the sign of a second planet in CoRoT-Exo-1b: Transit Timing Variation Analysis - *Sz. Csizmadia (Berlin, Germany), P. Barge (Marseille, France), S. Renner (Lille, France), et al.*

P-VIII-84 WHT observations of the CoRoT-Exo-2b secondary eclipse - *R. Alonso Sobrino (Marseille, France), H. J. Deeg (La Laguna, Spain), P. Kabath (Berlin, Germany), et al.*

P-VIII-85 Searching for transiting circumbinary planets in COROT data using CB-BLS - *A. Ofir (Tel Aviv, Israel), C. H. S. Lacy (Fayetteville, USA), H. J. Deeg (La Laguna, Spain)*

P-VIII-86 Timing variations on binaries with COROT - *J. Cabrera (Berlin, Germany), J. M. Almenara Villa (La Laguna, Spain), H. Deeg (La Laguna, Spain), et al.*

P-VIII-87 Improving CoRoT planets parameters with transit reconstruction in the presence of stellar activity - *A. Alapini, S. Aigrain (Exeter, UK)*

P-VIII-88 Short flux rises during transit events: Starspots or a second transiting planet? - *M. Rabus, J. A. Belmonte, H. Deeg (La Laguna, Spain)*

P-VIII-89 Searching for the moons of exoplanets - *D. Kipping, G. Tinetti, A. Aylward (London, UK)*

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P-IX-090 Automated frequency analysis and light curve modelling for CoRoT exofield data - *P. Degroote (Leuven, Belgium), J. Debosscher (Leuven, Belgium), J. Cuypers (Brussels, Belgium), et al.*

P-IX-091 Characterization of stellar variability in the CoRoT fields with BEST/BEST II - *P. Kabath, A. Erikson, H. Rauer, (Berlin, Germany) et al.*

P-IX-092 HD51106: an ellipsoidal binary observed with COROT - *N. Dolez (Toulouse, France), S. Vauclair (Toulouse, France), E. Michel (Meudon, France), et al.*

P-IX-093 New analysis of the evolved, semi-detached massive binary AU Mon based on CoRoT's first observations - *M. Desmet (Leuven, Belgium), Y. Fremat (Brussels, Belgium), P. Harmanec (Pragua, Czech Republic), et al.*

P-IX-094 The CoRoT secondary target HD 174884: a serendipitous EB-SB2 - *J. Montalban (Liege, Belgium), C. Maceroni (Monteporzio Catone , Italy), D. Ladjal (Leuven, Belgium), et al.*

P-IX-095 Low-mass binaries from CoRoT: stringent tests for stellar models - *J. C. Morales (Bellaterra, Spain), I. Ribas (Barcelona, Spain), C. Maceroni (Roma, Italy), et al.*

P-IX-096 First CoRoT results on new pulsators in eclipsing binaries - *P. Lampens (Brussels, Belgium), C. Maceroni (Monteporzio Catone , Italy), C. Aerts (Leuven, Belgium), et al.*

P-IX-097 Pulsation spectra of primary components of selected Algol-type variables in CoRoT fields - *D. Mkrtichian (Odessa, Ukraine), H. Lehmann (Tautenburg, Germany)*

P-IX-098 Young low mass eclipsing binaries in NGC2264 - *S. Aigrain, F. Favata, S. Hodgkin, et al. (Exeter, UK)*

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P-X-099 HD50170: A seismic binary - *F. Baudin (Orsay, France), J. Renan De Medeiros (Natal, Brazil), M.J. Goupil (Meudon, France), et al.*

P-X-100 Identifying red giants in the CoRoT exofield data - *S. Hekker (Brussels, Belgium), T. Kallinger (Vienna, Austria), F. Baudin (Tautenburg, Germany), et al.*

P-X-101 Exofield Oscillating Red Riants: Fundamental Parameters and first Results from Asteroseismology - *T. Kallinger (Vienna, Austria), W. W. Weiss (Vienna, Austria), S. Hekker (Leuven, Belgium), et al.*

P-X-102 Solar-like oscillations in red giants as observed by CoRoT: the case of HD 50890 - *C. Barban (Meudon, France), F. Baudin (Orsay, France), J. de Ridder (Leuven, Belgium), et al.*

P-X-103 Modelling of pulsations of giant stars - *M. Doru Suran, D. Pricopi (Bucharest, Romania)*

P-X-104 Seismic modelling of the red-giant CoRoT target HD181907 - *A. Miglio (Liège, Belgium), et al.*

P-X-105 Progress in the front of Extreme Horizontal Branch stars Asteroseismology - *V. Van Grootel (Toulouse, France), S. Charpinet (Toulouse, France), G Fontaine (V)?? et al.*

P-X-106 Effects of Rotation on the Asteroseismic Modelling of Red Giants - *P. Eggenberger, A. Miglio, J. Montalban (Liège, Belgium), et.al*

P-X-107 Excitation of g-modes in He burning blue supergiants - *M. Godart (Liège, Belgium), A. Noels (Liège, Belgium), M-A. Dupret (Meudon, France), et al.*

P-X-108 First RR Lyrae light curves from COROT: Multiperiodicity and Blazhko phenomenon - *M. Chadid (Nice, France), K. Kolenberg (Vienna, Austria), M. Paparo (Budapest, Hungary), et al.*

SESSION XII: **Rotation, convection, activity**

P-XII-109 Stellar activity and spectral classification: a quantitative analysis from the COROT light curves - *J.-C. Hulot (Orsay, France)*

P-XII-110 Stellar parameters of solar-type stars observed in the COROT Mission - *B. Leonardo Canto Martins, C. Cortés, L. Pinheiro de Souza Neto (Natal, Brazil), et al.*

P-XII-111 Rotation, convection and activity on giant stars: COROt preliminary results M. Fridlund - *(Noordwijk, The Netherlands), P. Gondoin (Noordwijk, The Netherlands), D. Garcia-Alvarez (London, UK), et al.*

P-XII-112 On the differential rotation of EXO-2A - *H.-E. Fröhlich (Potsdam, Germany)*

P-XII-113 Rotation and activity of NGC 2264 members - *G. Micela (Palermo, Italy)*

P-XII-114 Determination of stellar rotation period from COROT data - *I. de Castro Leão, D. Brito de Freitas, Y. F. Martinez Osorio (Natal, Brazil), et al.*

P-XII-115 The rotational history of the Sun and other star families - *J. Renan de Medeiros (Natal, Brazil), A. Baglin (Meudon, France), E. Janot-Pacheco (Sao Paulo, Brazil), et al.*

P-XII-116 Photospheric magnetic structures: spot modelling and analysis of the Fourier spectrum - *B. Mosser (Meudon, France), F. Baudin (Orsay, France), J.-C. Hulot (Orsay, France), et al.*

P-XII-117 Improved 'rotation-activity' relations in low-mass main-sequence stars from CoRoT photometry - *S. Messina, A. Lanzafame, S. Galeano (Catania, Italy), et al.*

P-XII-118 Hydrodynamical secular transport processes in rotating stars - *T. Decressin (Bonn, Germany), S Mathis (Gif-sur-Yvette, France), A. Palacios (Montpellier, France), et al.*

SESSION XIII: **The successors of corot**

P-XIII-119 Spectroscopic Study of Solar-Like Stars Selected for Candidates for Kepler Asteroseismic Targets - *J. Molenda-Zakowicz (Wrocław , Poland), A Frasca (Catania, Italy), D Latham (Cambridge, USA)*

P-XIII-120 Spectroscopic characterization of early-type Kepler targets candidates - *G. Catanzaro (Catania, Italy), A. Frasca (Catania, Italy), J. Molenda-Zakowicz (Wrocław, Poland)*

P-XIII-121 Observations of transiting extrasolar planets with the AIU Jena telescope in Grossschwabhausen - *S. Raetz, M. Mugrauer, T. Schmidt (Jena, Germany), et al.*

P-XIII-122 Accuracy of stellar parameters of exoplanet-host stars determined from asteroseismology - *C. Mulet-Marquis (Lyon, France 1), I. Baraffe (Lyon, France), F. Pont (Exeter, UK), et al.*

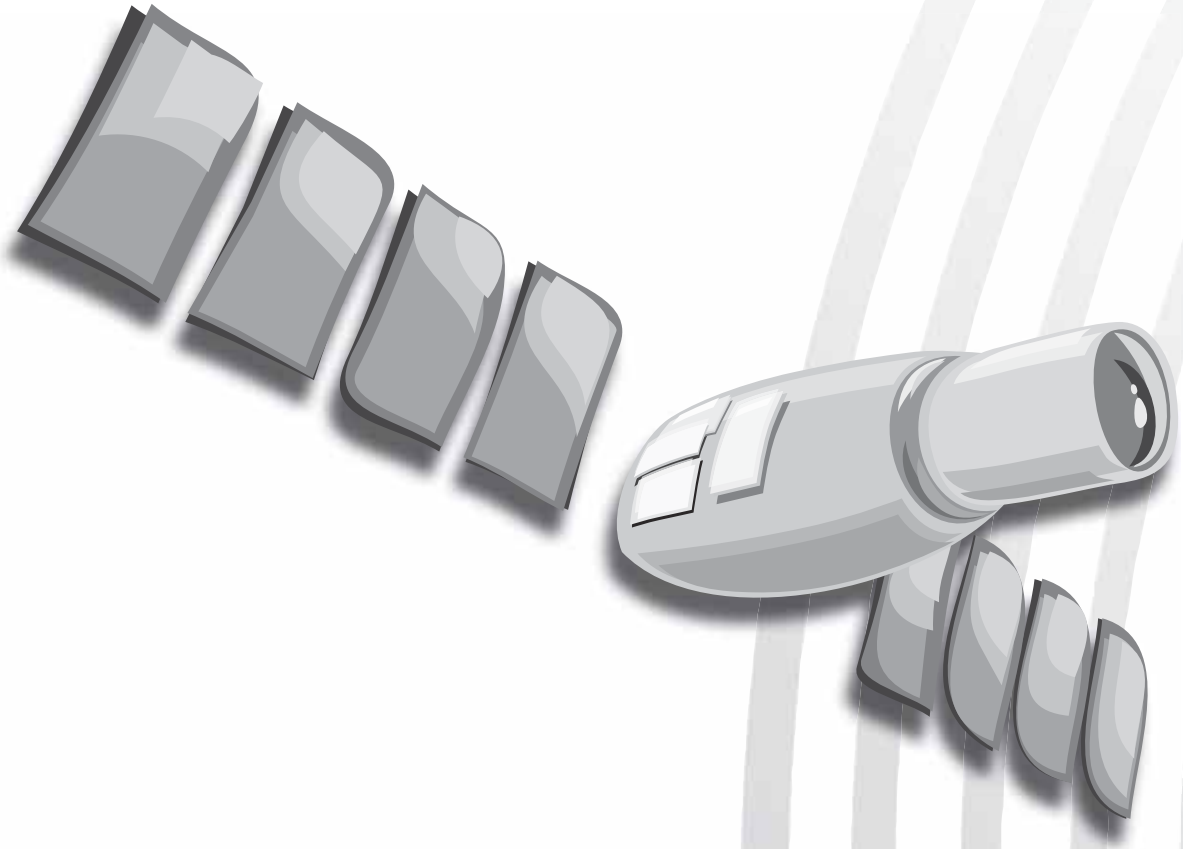
P-XIII-123 CARMENES: A new NIR echelle spectrograph for exoplanet and asteroseismology research - *P. Amado (Granada, Spain)*

P-XIII-124 The SACY project in the CoRoT windows - *C. A. O. Torres (Itajubá, Brazil), G. R. Quast (Itajubá, Brazil), L. da Silva (Rio de Janeiro, Brazil), et al.*

P-XIII-125 SIAMOIS: Ground-based asteroseismic observations in 1 site in antarctica - *B. Mosser, T. Buey, C. Catala (Meudon, France), et al.*

P-XIII-126 Laser and Z pinch experiments revealing plasma properties of seismic probes through the HR diagram - *S. Turck-Chieze, F. Delahaye (1), D. Gilles (Gif-sur-Yvette, France), et al.*

P-XIII-127 From CoRoT to PLATO - *T. Viard (Cannes, France)*



Abstracts

SESSION IA: The CoRoT mission after 2 years in orbit

Oral communications

O-I-01

INVITED TALK: O. VANDERMARCQ, CNES, (PARIS, FRANCE)

A JOURNEY IN THE EXPLOITATION OF THE COROT SYSTEM

As a space system, CoRoT is composed with a medium mass satellite which hosts the telescope, a ground control segment and a specific mission ground segment. The ground control segment itself, provides the capacity to operate and monitor the satellite ; it is based on a control centre, a ground station network and a communication network. The mission ground segment includes the mission centre in charge of the instrument programming and 1st level data production, two complementary mission ground stations and data centres in charge of the reduction, archive and distribution to the community of the scientific data.

The production cycle of the space data, which is repeated for each new observation run, is described through the following main steps:

- the preparation of the run, from the final selection of the stellar fields to the detailed scheduling of the operations ;
- the operational activities achieved to configure the satellite and instrument to observe new fields and the initialization of the data production chain ;
- the routine observation phase including the production with the stream of the 1st level data and the oversampling process loop of the exoplanet light curves ;
- the post observation phase including data reduction, archive and distribution process.

The first two years of exploitation of CoRoT allows to review the efficiency and quality of the system in terms of program coverage, operational availability and duty cycle. After completion of the early operations and calibration phase, light curves from about 100,000 stars have been captured through 9 observation runs. Except the first intermediate run which lasted for 55 days, the observations have been shared between 4 long runs (144 days in average of continuous observation) and 4 short runs (29 day long in average). The time devoted to observation has increased from a ratio of 88% of the in-orbit time for the first 3 runs to 93% for the next 6 ones. The duty cycle quantifies the availability of data during observation, mainly light curve data. Over the 4 long runs, the duty cycle reaches 98% for the seismology channels ; it is limited to 90% in the exoplanet case due to the crossing of the South Atlantic Anomaly where radiations make the measurements collected by the CCDs very difficult to exploit.

The development, the operations and the exploitation of CoRoT have been achieved under the overall responsibility of CNES in partnership with CNRS laboratories and with the contribution of Austria, Belgium, Brazil, ESA, Germany and Spain. As a medium mass satellite moving along a low Earth orbit, CoRoT is very efficient in producing numerous, long and continuous sequences of accurate photometric data ; it has opened the door to promising discoveries in both missions, stellar seismology and detection of exoplanet candidates.

Oral communications

O-I-02

INVITED TALK: A. BAGLIN (MEUDON, FRANCE), E. MICHEL (PARIS, FRANCE), P. BARGE (MARSEILLE, FRANCE), W. WEISS (VIENNA, AUSTRIA)

WHAT HAS BEEN ALREADY OBSERVED

SESSION IB: The Scientific Context

Oral communications

O-I-03

INVITED TALK: C. TERQUEM, IAP, ASTROPHYSICS, (PARIS, FRANCE)

THEORIES OF PLANET FORMATION AND MIGRATION

I will review the theory of planet formation. I will then describe how planet migration, which results from tidal interaction with the disk in which the planet is embedded, and mutual gravitational interactions in a system of planets modify the orbital elements and produce a variety of planetary systems.

Oral communications
O-I-04

INVITED TALK: J. P. ZAHN, LUTH - OBSERVATOIRE DE PARIS, (MEUDON, FRANCE)

ASTEROSEISMOLOGY: A IRREPLACEABLE TOOL TO CONFRONT THE GREAT CHALLENGES OF STELLAR PHYSICS

As its acronym reminds us, CoRoT was conceived to take up the great challenges of stellar physics, of which most are related to rotation and to thermal convection. The first results prove that this ambitious goal can indeed be met: not only will asteroseismology provide strong constraints on existing models, but it will certainly open the way to a new generation of stellar models, which will include physical processes that have been neglected so far.

SESSION I:
The CoRoT mission after 2 years in orbit.

Posters presentations

P-I-001

NEW INSIGHT ON PHOTOMETRIC PERTURBATIONS OF COROT LIGHT CURVES.

M. Auvergne, Observatoire de Paris CNRS (LESIA), (Meudon, France)

We present some recent results on the perturbations of the CoRoT light curves in the two channels after two years in flight. Evolution of the number of hot pixels on the seismology and exoplanet channels, effect of transiting satellite image in the field of view. At the beginning of each run full CCD images of the four CCDs are downloaded. Those images are processed to count the number of isolated bright pixels and to detect trace of images of satellite or debris in LEO.

Results on the two channels are compared. The frequency of transiting objects is compared to the outliers frequency in the light curves.

Posters presentations

P-I-002

FROM IMAGETTE TO LIGHTCURVE: THE EXO-IMAGETTE PIPELINE

R. den Hartog (1), R. Cautain (2), L. Jorda (2), M. Fridlund (3)
1 SRON , Utrecht, Netherlands ; 2 LAM , Marseille, France ; 3 : ESTEC, Noordwijk, The Netherlands

This paper describes the steps taken to obtain a lightcurve from raw imagette data. The imagette data offers spatially resolved information about the local point-spread function for 40 stars per run. This additional information can be exploited to solve problems due to cosmic rays and hot pixels, and allows a user-specified separation of the white lightcurve into color bands. Two methods are discussed for the construction of lightcurves: one based on PSF fitting and a much faster alternative based on optimal pixel alignment and selection. We illustrate the potential of the pipeline with several examples and tests.

Posters presentations

P-I-003

A SIMULATOR OF PHOTOMETRIC SURVEYS: APPLICATION TO COROT IN THE EXOPLANET FIELD

N. Crouzet, T. Guillot, Observatoire de la Côte d'Azur , (Nice, France)

SimPhot is a photometric simulator that includes astrophysical, atmospheric and instrumental parameters and noise sources. Fits images are generated and lightcurves are built via a basic data reduction process. The aim is to disentangle noise sources affecting the photometry. We use SimPhot to simulate CoRoT lightcurves. We compare the noise levels obtained in the real and simulated data and identify the dominant noise sources in the simulation. This study is key to understanding the yield of CoRoT in terms of planet detection, especially given the relative absence of giant planets around faint targets.

Posters presentations

P-I-004

DEVELOPMENT OF A HYBRID ALGORITHM FOR TIME-RESOLVED STELLAR PHOTOMETRY FROM SPACE IMAGES

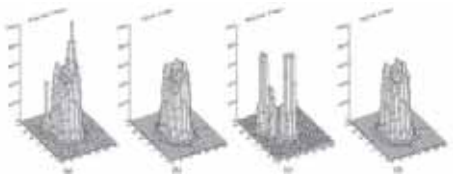
K. Iguchi (1), L. Pinheiro da Silva (1), H. Y. Kim (1), V. Parro (2), E. Janot-Pacheco (3)

1 Escola Politecnica da Universidade de Sao Paulo, Sao Paulo, Brazil ; 2 : Mauá Institute of Technology, Sao Caetano do Sul, Brazil ; 3 : Inst. de Astronomia, Geofisica e Ciencias Atmosfericas da Universidade de Sao Paulo, Sao Paulo, Brazil

The CoRoT satellite, inserted in a low Earth polar orbit, is exposed to a radioactive environment that may affect the instrumental components. Effects of charged particle impacts on the onboard electronics and optics have been minimized by the use of radiation-hard components and proper data reduction techniques. However, when the satellite crosses the South Atlantic Anomaly (SAA), the CCDs are exposed to up to 10 minutes of strong radiation, which means, up to 9% of the whole satellite's imaging duty cycle may be subjected to some kind of impact damage.

This work presents an innovative hybrid photometry algorithm that takes advantage of a high-resolution instrumental point spread function (PSF) and of the high signal-to-noise-ratio (SNR) obtained in the on-board aperture photometry, to extract a more accurate photometric signal from the observed stars. It takes into account the total standard deviation in each pixel, formed by Poissonian and readout noises.

The Figure below illustrates the main idea behind the hybrid algorithm: the acquired CCD image (a) provides a high SNR near the centroid of the star, but its direct exploitation (via aperture photometry) is very sensitive to jitter and SAA effects, while its modeled PSF (b) presents better SNR far from the centroid and is robust to particle impacts. The algorithm evaluates the uncertainties associated to each of these sources and then selects the best compromise between both – switching between high SNR central pixels and low uncertainty edge pixels, thus eliminating impacted and/or high uncertainty pixels (zoomed-in in (c)) in (a) and increasing the global SNR – to compose the final hybrid image (d) from which the light curve is later derived.



Preliminary studies indicate this methodology may achieve important gains in photometric precision and increase the imaging duty cycle up to 97%, enabling robust and accurate data exploitation.

Posters presentations

P-I-005

THE HERITAGE OF MOST: NOVEL DATA ANALYSIS TECHNIQUES FOR SPACE PHOTOMETRY

P. Reegen, Institute of Astronomy, University of Vienna, (Vienna, Austria)

The pioneer space mission dedicated to photometry of variable stars and exoplanet detection MOST\footnote{MOST is a Canadian Space Agency mission, jointly operated by Dynacon Inc., The University of Toronto Institute of Aerospace Sudies, the University of British Columbia, and with the assistance of the University of Vienna, Austria.} brought previously unknown challenges to data processing. The reduction of instrumental and environmental errors relies on the resolution of linear correlations between pixel intensities on the detector or integrated fluxes on multi-object frames. The statistically clean treatment of frequency-domain noise, as achievable using the SIGSPEC technique, permits a differential analysis of variable target vs. constant comparison stars in the frequency domain. Recent studies employing Bayesian analysis confirm the validity of this technique. A summary of the methods developed for MOST is provided, and their potential relevance for the CoRoT photometry is discussed.

Posters presentations

P-I-006

COROT DATA PRODUCTION AND DISTRIBUTION : PAST AND FUTURE

S. Chaintreuil, M. Bernard, R. Romagnan, Observatoire de Paris CNRS (LESIA), (Meudon, France)

This poster will present the agenda of the production and of the distribution of the acquired data of CoRoT. Informations concerning the runs, the dates and versions of the distributed data will be presented as well as the contents of the versions in terms of parameters and processings. Indications over encountered problems will also be given as well as their implications for the users of the data. A Schedule for the production of the newer runs and for the reproduction with better jitter corrections of the older runs will be given; the contents of these newer corrections will be briefly presented

Posters presentations
P-I-007
COROT DATA DISTRIBUTION
H. Ballans

Posters presentations
P-I-008
THE COROT ARCHIVE AT CDS
F. Ochsenbein, F. Genova
Observatoire Astronomique de Strasbourg, Strasbourg, France

The CDS foresees to host a copy of the final archive of the CoRoT mission, taking advantage of the service architecture available there which interconnects catalogues and mission logs (VizieR) and the observation archives (Aladin) with results published in the astronomical literature (Simbad). All these services being VO-compatible, the CoRoT results will also be accessible from any of the many tools aware of the VO protocols. This means that, for instance, the results of the CoRoT mission will come out from generic searches based on a position on the sky without having to specify explicitely an interest in the CoRoT mission.

Seen from the CDS team perpectives, this addition will also help us to improve the photometric contents of the Simbad database, for the benefits of the astronomical community.

Posters presentations
P-I-009
THE NASA STAR AND EXOPLANET DATABASE (NSTED)

D. R. Ciardi on behalf of the NStED Team, NASA Exoplanet Science Institute/Caltech, Pasadena, USA

The NASA Star and Exoplanet Database (NStED) is a general purpose star and exoplanet archive to support NASA's planet finding and characterization goals. There are two principal components of NStED: a database of approximately 140,000 nearby stars and exoplanet-hosting stars, and a database of high-precision photometric surveys for transiting exoplanets. For the nearby and exoplanet-hosting stars, NStED serves (where available): coordinates, multiplicity, proper motion, parallax, spectral type, multiband photometry, radial velocity, metallicity, chromospheric and coronal activity indices. In addition, NStED houses radial velocity and photometric time series data (as available) for all known exoplanet-hosting stars. NStED currently serves photometric time series data from the TrES Survey of the Kepler Field, from the KELT Survey of the Praesape Region, and from four stellar cluster surveys. As part of this service, NStED has entered into a collaboration with CNES/ESA to serve as the U.S. portal to the public CoRoT data. We present an overview of the NStED service - in particular, the NStED CoRoT data interface. The NStED archive is being developed in concert with the mission archive at IAS, and the archives at LAEFF and CDS.

Posters presentations
P-I-010
THE COROT PUBLIC ARCHIVE AT LAEFF
E. Solano, A. Velasco, R. Gutiérrez, M. López, M. Garcia Torres
LAEFF-INTA, Madrid, Spain

Public archives are defined in the framework of the CoRoT project as datacentres that manages the information freely available to the astronomical community. One of these public archives resides at LAEFF, as part of the Spanish Virtual Observatory. The CoRoT public archive at LAEFF was designed by the concept of delivering science-ready data in a simple and efficient way. An overall description of the capabilities and functionalities of the archive are described in this poster.

SESSION II:
Seismology of solar like stars

Oral Communications
O-II-05

SOLAR-LIKE OSCILLATIONS IN THE F STAR HD 181420 AS OBSERVED BY COROT

C. Barban (1), T. Appourchaux (2), A. Michel (1), A. Baglin (3), J. Ballot (4), F. Baudin (5), P. Boumier (2), C. Catala (6), W. Chaplin (7), S. Deheuvels (1), Y. Elsworth (7), R. Garcia (8), P. Gaulme (2), S. Jiménez Reyes (9), S. Mathur (10), E. Michel (1), B. Mosser (3), C. Régulo (9), I. Roxburgh (11), R. Samadi (6), G. Verner (11), T. CoRoT (12)

1 Observatoire de Paris, LESIA, Meudon, France; 2 Institut D'astrophysique Spatiale, Equipe Solaire Stellaire, Orsay, France; 3 Observatoire de Paris CNRS, LESIA, Meudon, France; 4 Observatoire Midi-Pyrénées, LATT, Toulouse, France; 5 Institut D'astrophysique Spatiale, Orsay, France; 6 Observatoire de Paris, LESIA, Meudon, France; 7 University Of Birmingham, School Of Physics And Astronomy; Birmingham, Uk; 8 Cea/Dsm/Dapnia, Service D'astrophysique, Saclay, France; 9 Instituto De Astrofísica De Canarias, Astronomy, La Laguna, Spain; 10 Indian Institute Of Astrophysics (Iia), Bangalore, India; 11 Queen Mary, University Of London, Astronomy Unit, School Of Mathematical Sciences, London, United Kingdom; 12 All, Astronomy

The detection and the analysis of solar-like oscillations in

stars other than the Sun is one of the main objectives of CoRoT. HD 181420 has been observed during the first long run and 156 days of data have been obtained in the CoRoT seismology field. The high quality and the continuity of the CoRoT data revealed unambiguously the signal associated with a rich spectrum of solar-like oscillations. We present here the detailed analysis of the light curve with the aim of determining the p-mode properties (e.g., frequencies, amplitudes and lifetimes) of this star.

Oral Communications
O-II-06

ANALYSIS OF POWER SPECTRA OF SUN-LIKE STARS USING A BAYESIAN APPROACH

T. Appourchaux, Institut d'Astrophysique Spatiale, Engeneering, (Orsay, France)

In this paper, I will review how power spectra of Sun-like stars can be treated using a Baysiean approach. I will show on the benefit of this approach w.r.t. to the classical frequentist approach. I will expose the various possible ways of implementing this approach for getting p-mode parameters. The data obtained by CoRoT will be used to show how this can be implemented on stars such as HD49933 and others stars. The impact on stellar evolution and modelling will be touched upon.

Oral Communications
O-II-07

EVIDENCE OF EXTRA MIXING FROM THE SEISMIC PROPERTIES OF THE SOLAR LIKE HD49933

M. J. Goupil (1), S. Deheuvels (1), A. Miglio (2), J. Provost (3), Y. Lebreton (4), J. Montalban (5), R. Samadi (1), J. Marques (1), M. Dupret (1), E. Michel (1), E. Baudin (6), C. Catala (1), O. Benomar (6), A. Baglin (1), A. Noels (5)

1 Observatoire de Paris, Lesia, Cnrs Umr 8109, Paris, France; 2 Universite De Liège, Liege, Belgium; 3 Observatoire de la Côte d'Azur, Nice, France ; 4 Institut D'astrophysique, ; 5 Université de Liège, Liege, Belgium ; 6 Ias, Orsay, France

The seismic properties of the CoRoT target HD49933 give evidence that its convective core is much larger than predicted when assuming a standard overshooting amount of 0.2 Hp. The talk will explain the process used to establish this result and will give a discussion of the its consequences

Oral Communications
O-II-08

THOROUGH ANALYSIS OF SEISMIC PROPERTIES OF THE SOLAR LIKE COROT TARGET HD49933

J. Montalban, University of Liege, Liege, Belgium

A power excess in the solar-like frequency domain was already detected in ground based observations of HD49933, but the first 60 days of CoRoT data during the IR have provided us with 45 individual frequencies of degrees l=0, 1, and 2. Classical observables such as effective temperature, luminosity, metallicity and radius have also been determined during the CoRoT preparatory phase. We combine a global exploration of the parameter space with the Levenberg-Marquardt miniminization algorithm to derive the fundamental parameters of HD 49933. We analyze the dependence of the solution on the chosen observables (seismic and classical ones), on their uncertainty, and on the physics used in stellar modelling.

Oral Communications
O-II-09

SMALL SEPARATIONS AND PHASE SHIFT DIFFERENCES OF $=0,1$ P-MODES

I. Roxburgh (1, 2)

1 Queen Mary, University Of London, London, UK; 2 LESIA, Observatoire de Paris, Meudon, France

We show that the periodicity in the small separations between p-modes of $=0, 1$ is determined by the acoustic radius of the base of the outer convective envelope. The mean variation is determined primarily by the structure of the inner core. The separations are related to the inner phase shifts differences $_1-_0$ which we show can be determined directly from the frequencies. The modulation period is shifted slightly by the frequency dependence of the phase shifts and the amplitudes. We present results using data from the BiSON, IRIS, and GOLF experiments, and a solar model, all of which give a modulation period of 3595Hz corresponding to an acoustic radius 142220 secs.

Oral Communications
O-II-10

MONTE CARLO MARKOV CHAINS APPLIED TO STELLAR MODELLING

M. Bazot, Centro De Astrofísica Da Universidade Do Porto, Porto, Portugal

The typical problem of stellar modelling consists in estimating the free parameters (typically the mass, the age, the metallicity, the mixing-length parameter) in the existing numerical descriptions using observational constraints (typically the effective temperature, the luminosity, the radius, the oscillation frequencies). An important feature of stellar models is their pronounced non-linearity. This leads very often to multiple solutions to the estimation problem, which could be observed either as broad continuous regions of acceptable parameters or even multiple solution regimes. In order to account for these problems, we apply the Monte Carlo Markov Chain (MCMC) methodology to stellar models. It allows to perform a stochastic sampling of the Posterior Probability Density (PPD) in the space of parameters and has the interesting propriety to be robust against non-linear models. Having access to the PPD allows to use statistical inference to obtain estimates of the parameters and associated confidence levels, and therefore robust values for the error bars. A brief description of the method is given. Results obtained for stars with known seismic data (from ground-based observations and from CoRoT) are presented and discussed. An emphasis is put on the quantitative improvement obtained on the estimated parameters using seismic data.

Poster presentations
P-II-011

SEARCH FOR SECOND-ORDER FREQUENCY VARIATIONS IN COROT DATA

M. Bazot, M. J. P. F. G. Monteiro, Centro de Astrofísica da Universidade do Porto, Porto , Portugal

First-order asymptotic description of stellar oscillation modes can be used to obtain observational data relatively free from the uncertainties related to surface effects, which cannot be reproduced satisfactorily by theoretical models. In practice, THE so-called large and small frequency separations have been tools of great diagnostic interest in asteroseismology. Using seismic data obtained for the sun-like star HD49933, we calculate these quantities and use them to constrain stellar models. The global parameters (here the mass and the age) are then estimated using a Monte Carlo Markov Chain (MCMC) algorithm coupled with the Aarhus Stellar Evolution Code (ASTEC). One of the by-products of this modelling is a set of theoretical frequencies, which can also be used to investigate the presence of second-order effects in the observed frequencies. We therefore compare the characteristics of the second-order terms in the best theoretical set and in the actual observed values. The goal is to established what can be further constrain through the seismic data of this specific star within the quoted observational uncertainties.

Poster presentations
P-II-012

THE HD49933 CASE

B. Othman, T. Appourchaux, F. Baudin, Institut d'Astrophysique Spatiale (Equipe solaire & stellaire), Orsay, France

The case of HD49933 has shown to be a difficult but interesting one: the structure of its p mode spectrum, combined with a lower than expected signal to noise ratio, make the spectrum analysis complicated. We present here a global analysis of the 2 runs aiming at HD49933 (60 and 150 day long) based on a Bayesian approach and the use of Monte-Carlo Markov Chains (described in Benomar, Co Ast 2008 and validated with simulated data in Benomar et al, A&A 2009). The problem of the mode identification raised by Appourchaux et al (A&A, 2008) is treated as well as a detailed analysis of the spectrum parameters and the implications for the seismic interpretation.

Poster presentations
P-II-013

BAYESIAN APPROACH FOR THE IDENTIFICATION OF SOLAR LIKE STAR OSCILLATIONS, WITH MAXIMUM A POSTERIOR

P. Gaulme, T. Appourchaux, IAS (Equipe solaire & stellaire), (Orsay , France)

HD181420 and HD181906 are two solar-like stars observed by CoRoT during 156 days. In both cases, the small signal-to-noise prevents us from identifying unambiguously the oscillation modes. Following suggestions of Appourchaux 2008, we apply a Bayesian approach to the analysis of these data. We compare the global fitting of the power spectra of these 2 time series, obtained by the classical maximum likelihood and the maximum a posteriori (MAP) methods. We particularly linger on the slight limit which separates a meticulous estimate of the fit parameters and the vision of the sought-after solution.

Appourchaux 2008. Astronomische Nachrichten, Vol.329, Issue 5, p.485

Poster presentations
P-II-014

SOLAR-LIKE OSCILLATIONS AND ACTIVITY IN HD 175726

B. Mosser (1), M. Auvergne (1), A. Baglin (1), E. Michel (1), R. Samadi (1), T. Appourchaux (2), F. Baudin (2), P. Boumier (2), H. Bruntt (3), C. Catala (1), J.-F. Donati (4), R. A. Garcia (5), S. Mathur (6), C. Regulo (7), I. Roxburgh (8), G. Verner (8)

1 Observatoire de Paris – LESIA, Meudon, France ; 2 IAS , Orsay , France; 3 University of sydney , Sydney , Australia; 4 OMP, Toulouse, France; 5 CEA, Gif - sur - Yvette, France , France, 6 Indian Institute Of Astrophysics (Ila), Bangalore, India ; 7 IAC Instituto De Astrofísica De Canarias, Astronomy, La Laguna, Spain ; 8 : Queen Mary, University Of London, Astronomy Unit, School Of Mathematical Sciences, London, UK

HD175726 is an F9 star and was observed by CoRoT during the first short run in the centre direction. The 27.2-day long light curve presents a large activity signal, but its spectrum reveals only a very weak seismic signature. The oscillation amplitude, about 1 ppm at maximum, is about 3 times smaller than expected from the scaling law $A\\propto(L/M)^0.7$. This reinforces the idea that magnetic fields may inhibit stellar convection and hence weaken the excitation of pressure modes.
Despite the very low signal-to-noise ratio, we have measured the mean large separation of 97 microHz. We present how the weak seismic signature was analysed, and the results it yields when complemented with the analysis of ground-based spectrometric and spectropolarimetric measurements.

Poster presentations

P-II-015

THE PROCYON CAMPAIGN: FREQUENCY ANALYSIS AND MAXIMUM LIKELIHOOD ESTIMATION OF MODE PARAMETERS

T. Campante (1), H. Kjeldsen (2), T. Bedding (3), M. Monteiro (1)

1 Centro de Astrofísica da Universidade do Porto, Porto , Portugal ; 2 Danish AsteroSeismology Centre, Department of Physics and Astronomy, University of Aarhus, Aarhus, Denmark ; 3 Institute of Astronomy, School of Physics, University of Sydney, Sidney, Australia

A multi-site campaign to measure oscillations in the F5 star Procyon A was carried out from 2006 December 28 until 2007 January 23, employing eleven telescopes at eight observatories. High-precision velocity measurements were obtained, in what has been the most extensive campaign so far organized on any solar-type oscillator. A set of ad hoc weights intended to optimize the window function was used in the calculation of the combined power spectrum. Iterative-Sine-Wave-Fitting (ISWF) was applied in extracting candidate modes of oscillation and two distinct ridges could, subsequently, be established in an échelle diagram based on the extracted frequencies. A total of 17 orders were selected from this diagram for further analysis. Autocorrelation of the window-optimized power spectrum returned an estimate for the large separation of ~55.3 μHz. An unambiguous identification of the ridges in the échelle diagram was only possible after applying a likelihood ratio test to the two possible identification scenarios. In order to do so, Maximum Likelihood Estimation (MLE) was applied to the power spectrum, thus allowing for the identification of the ridges, as well as for the extraction of robust estimates of the mode parameters (central frequencies, amplitudes, peak linewidths, rotational splitting) and determination of their formal uncertainties. The dependence on frequency of $\delta\upsilon$, $\Delta\upsilon$ and the linewidth could then be visualized.

Poster presentations

P-II-016

P-MODE CHARACTERISTICS OF HD-181906

R. A. Garcia (1), C. Regulo (2), T. Appourchaux (3), M. Auvergne (4), A. Baglin (4), J. Ballot (5), C. Barban (4), P. Boumier (3), C. Catala (4), Y. Elsworth (6), W. J. Chaplin (6), P. Gaulme (3), S. Mathur (7), E. Michel (4), B. Mosser (4), F. Perez-Hernandez (2), I Roxburgh (8), R. Samadi (4), T. Toutain (6), G. Verner (8)

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HD181906 is an F8 star (effective temperature ~6830 K) observed for 156 days by CoRoT during the first long run of the centre direction. Analysis of the data reveals a spectrum of solar-like acoustic oscillations. However, the faintness of the target (v~7.65) means the S/N in the acoustic modes is quite low, and this low S/N leads to complications in the analysis.
We have been able to infer the mean surface rotation rate of the star (~4 microHz), the inclination angle (in the range 40 to 50 degrees), the large separation of the p modes (~85 microHz), and therefore also the «ridges» corresponding to overtones of the acoustic modes. In addition to presenting these results, we shall also discuss analysis undertaken to extract individual frequencies, and to tag angular degrees of the modes.

Poster presentations
P-II-017
ENHANCING THE SIGNAL-TO-NOISE RATIO OF SOLAR-LIKE TARGETS

R. A. Garcia (1), J. Ballot (2), S. Mathur (3), P. Lambert (4), C. Regulo (5)

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The analysis of the first solar-like targets done by CoRoT have shown that the oscillation amplitudes are about 25% below the theoretical amplitudes while the convective background is up to three times higher than in the solar case. In such conditions the Comb-like structure of the acoustic modes has smaller signal-to-noise ratios than initially expected complicating the characterization of individual modes. In the present work we apply the curvelet filtering plus a partial reconstruction of the signal from the obtaining spacing of the comb-like structure of the acoustic modes, to the solar-like targets already observed by CoRoT to enhance the signal-to-noise ratio of the ridges in the echelle diagrams and we study how the analysis of the p modes can be improved.

Poster presentations
P-II-018
HD 49385: A COOL SOLAR-LIKE STAR OBSERVED BY COROT

Sebastien Deheuvels, CoRoT Builders, DAT Team , Observatoire de Paris, Meudon, France

One of the announced goals of space mission CoRoT is to achieve a better knowledge of solar-like stars stars by a very high level characterization of their oscillations. Recently, the CoRoT data obtained on solar-like pulsators significantly hotter than the Sun have been discussed in Michel et al. (2008) and Appourchaux et al. (2008). HD 49385 is a G type star presenting solar-like oscillations, and with a cooler temperature, closer to that of our Sun, though apparently in a more advanced stage of evolution. We perform a global fitting of the modes, based on a maximum likelihood estimation of the power spectrum. A very high SNR combined with a long period of almost uninterrupted data (137 days) allows us to obtain precise estimates of the frequencies, amplitudes and linewidths of the modes. These results are discussed in the light of those obtained on the Sun and previous CoRoT targets.

Poster presentations
P-II-019
MODELLING COROT'S SOLAR LIKE STARS

Ian Roxburgh (1, 2)

1 Queen Mary, University of London, London, UK ; 2 LESIA, Observatoire de Paris, (Meudon, France)

Different frequency sets determined for solar like stars observed by CoRoT are used to extract the internal phase shift differences $\delta1 - \delta_0$ which gives a diagnostic of their internal structure and the acoustic radii of regions of sharp change in the internal structure. These are compared with predictions of detailed numerical and simple acoustic stellar models to place constraints on the internal structure of these stars.

Poster presentations
P-II-019b
TIME AUTOCORRELATION AS A DIAGNOSTIC OF SOLAR-LIKE STARS

I. Roxburgh (1, 2)

1 Queen Mary, University of London, London, UK; 2 LESIA, Observatoire de Paris, Paris, France

I discuss the use of the autocorrelation of an observed photometric time series as a diagnostic tool for probing the properties of solar-like oscillating stars when the signal to noise is small and the determination of individual frequencies is not possible or is subject to large uncertainties. The power in the autocorrelation - or equivalently the power spectrum of the frequency power spectrum can be used to reveal properties of the large separation and of its variation with frequency.

Poster presentations
P-II-020

ACCURATE FUNDAMENTAL PARAMETERS OF THE COROT ASTEROSEISMIC TARGETS

Hans Bruntt, University of Sydney, Sydney, Australia

One of the main goals of the CoRoT mission is to probe the interior physical properties of stars based on detailed analyses of their frequency spectrum obtained from the light curves. Recent results from CoRoT for sun-like stars give the large separation from which the mean density can be inferred. Deeper insight is only possible from a direct comparison of individual frequencies with theoretical pulsation models. For this the fundamental atmospheric parameters are critical input parameters (effective temperature, surface gravity and metallicity). We present detailed spectroscopic analyses based on high-resolution spectra of the three first sun-like stars observed with CoRoT: HD 49933, HD 181420 and HD 181906. The precise measurement of the large separation in these stars provides an important benefit for the spectral analysis, since the surface gravity can be determined with an uncertainty of just 0.03 dex for stars near the main sequence when the large separation is known to within 1 μHz (0.06 dex for 2 μHz). In the case of HD 181906 we find that the stellar spectrum contains two sets of lines and hence the star could be a spectroscopic binary. The contamination of the stellar spectrum by the secondary star, which is about 2 times fainter, makes the analysis more complicated, and we present an approach to determine the parameters of both stars.

Poster presentations
P-II-021

WHICH CONSTRAINTS CAN WE SET ON THE CONVECTIVE CORE OF HD49933?

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1 Max Planck Institute for Astrophysics, Muenchen, Germany ; 2 Laboratoire d'Astrophysique de l'Observatoire Midi-Pyrénées, Toulouse, France

The first asteroseismology results from CoRoT have been published on the data obtained for HD49933, a F5 V star presenting solar-like oscillations (Appourchaux et. al 2008). By analyzing the power spectrum obtained during the initial run (60 days), the frequencies of more than 40 acoustic modes have been measured. However, some difficulties in unambiguously identifying the degrees of these modes have appeared, leading to two different plausible scenarios for the identification. By means of statistical tests, the authors have favoured one of them. In this poster, we will first show whether we can use a priori knowledge from stellar models to help in the mode identification. Next, we will discuss the constraints we can put on the structure of this star by taking into account the seismic information. We will especially focus on the convective core properties, addressing the question of overshooting. With this purpose, we have computed a grid of specific models with the Garching Stellar Evolution Code (GARSTEC) coupled with the Adiabatic Pulsation Package (ADIPLS) for the computation of mode frequencies.

Poster presentations
P-II-022

INTERPRETATING THE OBSERVATIONS OF HD49933

O. Creevey (1), M. Bazot (2)

1 Instituto de Astrofísica de Canarias, La Laguna, Spain ; 2 Centro de Astrofisica da Universidade de Porto, Porto, Portugal

HD49933 is a main sequence solar-type star that was observed by CoRoT. It is the first such CoRoT target where solar-like oscillations have been measured. Here we perform a modelling analysis of HD49933, including a determination of the mass and the age of the star. We present independent methods of interpreting the observed frequencies, while placing an emphasis on defining the boundaries of the parameter space where the model of this star lies, and on the uncertainties calculated for the estimated parameters. We investigate what observations may help to reduce these boundaries.

Poster presentations

P-II-023

ASTEROSEISMIC MODELLING OF PROCYON A BASED ON RECENT FREQUENCY ANALYSES

G. Dogan (1), A. Bonanno (2), T. Campante (3), T. R. Bedding (4), J. Christensen-Dalsgaard (1), H. Kjeldsen (1)

1 Danish AsteroSeismology Centre (DASC), Department of Physics and Astronomy, University of Aarhus, Aarhus, Denmark; 2 INAF - Osservatorio Astrofisico di Catania, Catania, Italy; 3 Centro de Astrofisica da Universidade do Porto, Porto, Portugal; 4 Institute of Astronomy, School of Physics, University of Sydney, Sydney, Australia

Oscillation frequencies of the F5 star Procyon A have been obtained from several observing campaigns, including a multi-site campaign carried out between December 2006 and January 2007, which had the best coverage ever achieved for this star. We present a study of modelling the star including the comparison between the results of two different evolutionary codes that have been employed: ASTEC (Aarhus STellar Evolution Code) and GARSTEC (Garching Stellar Evolution Code). We have used the observational constraints to determine the position of the star in the HR diagram. We have then computed grids of evolutionary sequences, varying the observational parameters in the uncertainty range as well as making use of other parameters to result in a better fit. Aarhus adiabatic pulsation package (ADIPLS) has been used to calculate the frequencies of the models having parameters within the observed uncertainties. We present the results of our search for the models that would best reproduce the observed frequencies.

Poster presentations

P-II-024

RELATIVE WEIGHTS OF THE OBSERVATIONAL CONSTRAINTS ON THE DETERMINATION OF THE STELLAR PARAMETERS

N. Ozel (1), M.-A. Dupret (1), A. Baglin (1), LESIA-Observatoire de Paris, Meudon, Paris

We study the effect of using different observed quantities (frequencies, binarity, interferometric) and the impact of their accuracy on constraining the uncertainities of global free stellar parameters (i.e. the mass, the age etc.). We use the Singular Value Decomposition (SVD) formalism to analyse the behavior of the χ^2 fitting function around its minimum. This method relates the errors in observed quantities to the precision in the model parameters. We apply this tool to the particularly interesting binary system α Cen for which, seismic, binarity and interferometric properties are known with high accuracy. We apply also this tool to the study of the CoRoT target HD 49933 for which the mass and the radius constraints are not available. We determine how the seismic data and their accuracy affect the precision obtained on the global stellar parameters for relatively distant stars.

Poster presentations
P-II-025

ASTEROSEISMIC MODELLING OF BETA HYDRI

I. Brandão (1), G. Dogan (2), T. Bedding (3), J. Christensen-Dalsgaard (2), H. Kjeldsen (2), H. Bruntt (3), M. Cunha (1)

1 Centro de Astrofísica da Universidade do Porto, Porto, Portugal; 2 Department of Physics and Astronomy, University of Aarhus, Aarhus, Denmark ; 3 School of Physics A28, University of Sydney, Sydney, Australia

We present the results of a detailed study performed on the pulsating evolved solar type star β Hydri, based on recent seismic and non-seismic data available in the literature. From several evolutionary tracks that we computed using the evolutionary code ASTEC with different input parameters and different physics, we chose the models that were in agreement with the observationally determined position of β Hydri in the HR diagram. We then used seismic data to complement the constraints on the models. For each of the models we computed the theoretical oscillation frequencies using the ADIPLS code. To choose the model that best reproduces the oscillation properties of β Hydri and to correct the theoretical frequencies of the best model from near-surface effects, we used the method described by Kjeldsen et al. 2008. Modelling the oscillation spectrum of β Hydri is not a trivial issue.
This evolved star exhibits avoided crossings in its p-mode spectrum that substantially affect the l=1 modes. We show that, after applying the correction for near-surface effects on the frequencies of the best model, we can reproduce well the observed modes with degrees l=0 and l=2 but not the l=1 modes. A better modelling of mixed modes is therefore needed. This work thus confirmed that the empirical correction proposed by Kjeldsen et al. 2008 reproduces successfully the frequencies, not affected by avoided crossings, of β Hydri.

Poster presentations
P-II-026

DYNAMICAL MODELING OF ASTEROSEISMIC TARGETS COMBINING 3D AND 1D MODELS

L. Piau (1), R. Stein (2), S. Mathis (3), S. Turck-Chièze (3), A. Palacios (4)

1 Commissariat à l'énergie atomique, centre de Saclay (Service d'astrophysique), Gif - sur - Yvette, France ; 2 Michigan State University (Department of Physics and Astronomy), East Lansing, USA ; 3 Commissariat à l'énergie atomique, service d'astrophysique, centre de Saclay (CEA), Gif-sur-Yvette, France ; 4 GRAAL, Université de Montpellier, Montpellier, France

We couple the STAGGER (Stein and Nordlund 1998) hydrodynamical code which performs surface 3D modeling of convection with the 1D stellar code CESAM (Morel 1997) to follow the evolution of solar type stars. Doing so, the hydrodynamical behaviour of the subsurface layers is introduced in the secular code that compute the current structure and eigenfrequencies. We outline the effect of an increase of rotation on the thermal profile of the superadiabatic region in comparing STAGGER outputs for different local rotation rates. The specific entropy jump of the upper convection zone depends on the surface gravity, the effective temperature but also on this local rotation rate. Then we translate the results in terms of a mixing length \'alpha\' parameter in CESAM. Consequently, the convection of the secular models is calibrated hydrodynamically instead of using the solar radius as generally done. Moreover the CESAM code is enriched by the recent dynamical transport equations for rotation of Mathis & Zahn (2004) so we model both the dynamic effects of rotation and convection. Our approach can be applied to any solar like star. We illustrate our approach in looking to the impact of the dynamical processes on the eigenfrequencies in the case of HD49933 and in comparing the theoretical solar rotation profile using different initial conditions (Turck-Chièze, Palacios, Nghiem 2009) to the observed one (Eff-Darwich et al. 2008, Mathur et al. 2008). We finally build a grid of models of HD49933 showing the structural and seismic effects of an improved modeling of convection and rotation. This work is a first step. The understanding of the internal rotation profile of solar like stars will certainly require to add new processes (Duez et al, this conference).

Poster presentations

P-II-027

EXPLORATION OF PARAMETER SPACE FOR MODELING COROT TARGETS WITH CESAM/CLES CODES

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In order to determine the unknown parameters of stellar models that allow to fit the observational constraints of a given star χ2 minimization methods such as the Levenberg-Marquardt method are currently used. However the direct application of a minimization method may be dangerous if there are not enough observational constraints available. In that case, several local minima could exist, and the space of solutions might be degenerate. To be prepared to this eventuality we have computed a wide grid of stellar models and their associated oscillation frequencies and we have designed a tool to evaluate the value of χ2 on that grid for different possible sets of observational data. The χ2 function of a set of theoretical stellar parameters provides the starting point for the application of the Levenberg-Marquardt algorithm and is therefore the basis of deep analysis and interpretation of the seismic and classical observables. Stellar models have been calculated either with the CESAM or the CLES stellar evolution code for values of the mass in the range 0.80-2.00 solar masses, initial metallicity Z in the range 0.005-0.02 in mass fraction and initial helium abundance in the range 0.26-0.28, and we considered different values or options for the input physics of the models (microscopic diffusion, mixing-length parameter of convection, overshooting parameter). The oscillation frequencies have been computed with the LOSC code for p-modes of degree l=0, 1 and 2.

Poster presentations

P-II-028

ON EXTRACTING SIGNATURES OF SMALL CONVECTIVE CORES FROM SPACE-BASED DATA

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Stars slightly more massive than the sun develop small convective cores during their Main Sequence phase of evolution. The edges of these convective cores are associated with rapid variations in the sound speed which may influence the frequencies of acoustic oscillations. In 2007, Cunha & Metcalfe derived the signature that a small convective core is expected to produce in the oscillation frequencies of solar-like pulsators. Unlike previous analysis, which required that the edge of the core is placed well within the propagation cavity of the modes, their analysis is valid for the study of tiny convective cores, such as those expected in stars only slightly more massive than the sun. Having anticipated the functional form of the signature of small convective cores, the authors proposed and tested a seismic tool (i.e., a combination of frequencies) that isolates that signal. Moreover, they showed that such seismic tool could be successfully applied to data of the quality expected from space-based instruments, such as CoRoT. Despite this, it was clear that space-based data alone could not provide the necessary elements to apply directly the proposed seismic diagnostic tool, since the latter required modes of degree up to l=3. Nevertheless, perturbations produced by convective cores have impact also in quantities that can be derived from space data, such as the small separations. Thus, the functional form of the perturbations can be used to anticipate the signature that small convective cores will leave on these quantities. In this presentation we will discuss the theoretical signal derived by Cunha & Metcalfe and its implications to seismic quantities that may be derived from CoRoT data, bridging the convective core signatures left on these quantities to the underlying physics.

Poster presentations
P-II-029

MHD MODELLING OF STELLAR INTERIORS OVER SECULAR TIME-SCALES

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With the development of asteroseismology and of spectropolarimetry, it is now crucial to get a complete picture of MHD processes impact on stellar interiors over secular time-scales. To achieve this aim, the first step is to study the modification of the stellar structure by the magnetic field and the possible equilibrium field configurations. We thus derive the field structure in such states and we establish the hierarchy between the different magnetic terms. Then, it is necessary to go beyond those equilibrium states and to study MHD transport mechanisms which occur in stellar radiation zones over secular time-scales. A state of art for each of them is then given and we discuss the method to implement them in stellar evolution codes to model the Sun and some asteroseismic targets.

Poster presentations
P-II-030

NEW MODELS FOR THE COROT PRIMARY TARGET HD 52265, INCLUDING CORE OVERSHOOTING

M. Soriano, S. Vauclair, Laboratoire d'Astrophysique de Toulouse-Tarbes, France

HD 52265 is the only exoplanet host star to be observed as a main target of the seismology programme of the CoRoT mission. In Soriano et al. 2007, we computed preliminary models and analyzed their oscillation frequencies, as a preliminary work.
Here we present new stellar models, computed with overshooting at the edge of the convective core. We show the influence of this overshooting on the frequencies of HD 52265, and more specifically on the small separations. Contrary to the predictions of the asymptotic theory, the small separations can become negative, and the frequency where this happens is related to the extension of the central mixed zone. These models will be ready for comparison with the CoRoT observations.

Poster presentations
P-II-030b

NUMERICAL SIMULATIONS OF P-MODE DAMPING IN MAIN SEQUENCE STARS

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In its first two years of operation CoRoT has gathered, among others, data of unprecedented quality on p-mode oscillations in F-type main sequence stars. The life time of p-modes driven by turbulent convection is one of the main physical quantities of interest to learn about the driving and damping of p-modes on the one hand and on the nature of stellar surface convection zones on the other. Here, we report on a series of numerical simulations of convection in the near surface layers of main sequence stars over long time scales of several days aimed at extracting information on both p-mode driving and damping as observable within a limited simulation volume. Simulations of solar convection are at an advanced staged and are now followed by simulations for the CoRoT targets HD 49933 and later on for HD 181420.

SESSION III:

Detection of transits, methods and results

Oral Communications
O-III-11

TRANSIT DETECTION IN THE COROT LIGHT CURVES: AN OVERVIEW ON METHODS AND RESULTS

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In this paper are presented the organization and the methods used by the CEST detection teams to detect transit signals in the light curves. We also show the problem encountered in the sorting of the candidates and present an overview of the results found in the first run observed by CoRoT.

Oral Communications
O-III-12

PLANETARY TRANSIT CANDIDATES IN COROT-IRA01 FIELD

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Context: CoRoT is a pioneer space mission devoted to the analysis of stellar variability and the photometric detection of extrasolar planets.
Aims: We present here the list of planetary transit candidates detected in the first field observed by CoRoT: IRa01, the initial run toward the galactic anti-center, which lasted 60 days.
Methods: 3898 sources in the chromatic bands and 5974 in the monochromatic band where analyzed; instrumental noise and the stellar variability were treated with detrending tools to apply then on the filtered light-curvesseveral transit search algorithms.
Results: 50 sources were classified as planetary transit candidates and the best 40 have been or will be soon followed-up. So far two of them were confirmed as planets, for which a dedicated study has been performed.

Oral Communications
O-III-13

THE COROT PLANETARY TRANSIT DETECTION THRESHOLD

F. Pont, University Of Exeter, School Of Physics, Exeter, UK

The detection threshold of CoRoT for planetary transit is a key factor in the success of the mission. It depends on many different factors along the chain linking raw observations to eventual planet radial-velocity confirmation, including the correction of instrumental systematics, the effect of hot detector pixels, stellar variability, the population of statistical and astrophysical false alarms, and the vagaries of the ground-based photometric and spectroscopic follow-up. We use an empirical approach based on the experience of previous transit surveys and the two first years of the CoRoT mission to characterise the transit detection threshold, and study the implications in terms of planet detection.

Oral Communications
O-III-14

PLANETARY TRANSIT DISCRIMINATION WITH THE HELP OF COLOR INFORMATION IN COROT LIGHT CURVES

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For the brightest stars observed in the exoplanet fields, CoRoT provides light curves in three different photometric color channels thanks to its on-axis biprism. In this paper we show how these three color channels can be combined to help discriminate between genuine planetary transits and astrophysical false positives such as foreground or background eclipsing binaries. We illustrate our approach with the tricky case of a very small planet candidate.

Oral Communications
O-III-15

ASSESSING THE CONFIDENCE OF LOW SIGNAL-TO-NOISE TRANSIT CANDIDATES FROM COROT LIGHT CURVES

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Now that CoRoT has demonstrated its capability to detect giant planets, the focus has shifted toward the search for low signal-to-noise transit candidates as the path both to small planet detection, and to statistical studies of planet properties as yielded by the whole CoRoT survey. We present here a Monte-Carlo approach to assess the statistical significance of low signal-to-noise candidates detected in the CoRoT light curve by means of a specifically tailored matched-filter based algorithm. We compare the results obtained with real CoRoT data to theoretical expectations for data containing only photon noise.

Poster presentations

P-III-031

IMPROVING TRANSIT SEARCH ALGORITHMS BY APPROPRIATE PREFILTERING OF COROT LIGHTCURVES

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The measurements of CoRoT are influenced by the satellite environment as well as by the activity of the observed stars. Since the major scientific goal is the detection of transit signals, the measured lightcurves needed to be cleaned from instrumental and stellar variations. A discrete Fourier filter is constructed by generating a set of artificial transit light curves with varying parameters of the planetary transit using Monte Carlo methods. The filter is based on the idea that a typical transit signal represents only a fraction of the mathematical functional space. The three dimensional parameter space consists of the length, depth and the inclination of the transit. Our method was tested and verified on different datasets which included synthetically lightcurves which simulated detrended lightcurves with transit signals and the CoRoT Blind Test (BT4). We show in this paper that in most of the cases the developed filter was able to improve the signal-to-noise-ratio (SNR) significantly and therefor leading to an enhanced detection rate of the algorithms. However in some cases artifacts are generated due to the filter response.

Poster presentations

P-III-32

AN EFFICIENT ALGORITHM FOR ANALYSIS OF STELLAR LIGHT CURVES AND DETECTION OF TRANSITS

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1 Austrian Academy of Sciences, Space Research Institute (Department of Extraterrestrial Physics), Graz , Austria; 2 Lobachevsky State University, Nizhny Novgorod (Department of Radiophysics), Nizhny Novgorod, Russia; 3 Austrian Academy of Sciences, Space Research Institute, Graz, Austria

To study the quasi-periodic and impulsive features in the CoRoT light curves which may be possibly related to the stellar seismology processes and planetary transits, an original data analysis algorithm is proposed. The algorithm appears as a combination of a sliding window Fourier (SWF) and the nonlinear Wigner-Ville (WV) methods.Both methods (WV and SWF) combined in a proper way, together with different types of the signal processing and filtration, allow detection of complex multi signal modulations in the analyzed data records and enable to obtain the dynamical spectra of these modulations. SWF-WV method is especially efficient for the high resolution frequency-time analysis of signals with non-stationary and impulsive modulations. As applied for the analysis of stellar light curves, recorded by CoRoT, the SWF-WV algorithm enables to obtain the dynamical spectra of long-periodic (LP) signals which modulate luminosity of a star. Analysis of these LP dynamical spectra allows judging about global dynamical processes the stellar system and possible presence of planets in it. Several examples of applications of SWF-WV method for the analysis of CoRoT "blind-test" signals are presented. For successful operation of the SWF-WV data analysis algorithm, the sampling cadence of an analyzed data series should provide sufficient number of the data points: not less then 10,000 points per realization. The length of the analyzed data series should be consistent with the time scales of considered dynamic phenomena, i.e. the duration of an analyzed data set should include at least several periods of the modulating component.

Poster presentations

P-III-33

SEARCHING FOR TROJAN ASTEROIDS IN HD 209458 AND OTHER EXOPLANETARY SYSTEMS

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We present an ongoing search for Trojan asteroids dynamically linked with the transiting "hot Jupiter" HD 209458b using MOST satellite photometry obtained in 2004, 2005, and 2007. The presence and nature of asteroids around other stars would be a test of formation and migration models of exoplanetary systems. Our results set an upper limit on the mass of Trojans in HD 209458 that will guide current and future searches of similar systems by CoRoT.

The photometry consists of three nearly continuous light curves (14, 44, and 28 days each) which we have 'folded' and binned at the known period (3.52 days) of HD 209458b. To gauge our sensitivity to Trojan transits, we tested the statistical properties of the data through bootstrapping, and introduced artificial transits into the data to establish recovery limits.

In our preliminary analyses, the MOST photometry are sensitive to Trojan transits as shallow as 10-4, corresponding to a Trojan swarm (assuming the Solar System Trojan size distribution) of about 1 lunar mass. Can enough Trojans survive collisional depletion and the Yarkovsky effect to leave a lunar mass of asteroids 0.045 AU from a solar-type star? We are generating numerical models to address this question, where the principal free parameter is the initial mass of Trojans before HD 209458b migrated to its current orbit.

The results of these numerical simulations, coupled with limits set by MOST observations, yield photometric detection requirements and limits on the maximum masses of "hot Trojan" swarms that could exist. Hence, we forecast likely detections by CoRoT and Kepler, and present a standard method for exo-asteroid searches applicable to any system.

Poster presentations

P-III-34

HOW CAN WE DETECT PLANETS IN EXCHANGE ORBITS

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'Exchange orbits' are a special form of orbits of two planets in 1:1 mean motion resonance to each other. In the Solar system we know that Trojan asteroids may stay always about 60 degrees before or behind Jupiter in their orbits; their stability can be explained in the simple model when the asteroids are regarded as massless. Since the discovery of Saturn's satellites Epimetheus and Janus it is known that even the so-called horseshoe orbits (seen in a rotating coordinate system fixed to one planet) exist in nature when two massive bodies are in orbit around a central body with the same semimajor axis and quite small eccentricities; even perturbations of additional (bodies) planets do not destroy their stability. In the physical space it means that during every encounter the two planets change their positions from inner to outer orbit or vice versa. We check how such a configuration could be discovered by transits due to the observed lightcurves. These 'exchange orbit' configurations are difficult to detect by radial velocity and astrometry.

Poster presentations

P-III-35

PERFORMANCE OF EXOTRANS ON COROT LIGHTCURVES

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ExoTrans is a detection algorithm software specifically developed for CoRoT. It contains two different filter algorithms for prewhitening and noise reduction of the light curves (harmonic and trend filtering). Three different variations of box-fitting least square algorithms are applied (BLS, dc-BLS, unmaxBLS) for the transit search. The performance of each filter-BLS-algorithm combination on real CoRoT data are presented and compared.

Poster presentations

P-III-36

BOX LEAST SQUARES (BLS) AS AN ORBIT-FITTING ALGORITHM

A. Ofir, Tel Aviv University, Tel Aviv, Israel

Context. The BLS (Box Least Squares) algorithm (Kovacs, Zucker and Mazeh 2002, hereafter KZM) is the workhorse of planetary transits detection, being used on all the major transit surveys to detect the very small periodic dimming of the host stars. For this reason BLS should be understood completely, especially as all surveys are now pushing towards smaller and smaller signals.

Aims. Following previous work, we re-interpret BLS as an orbit-fitting algorithm and find that this interpretation uncovers two small flaws in the logic of BLS. The main flaw prevents BLS from correctly accounting for the sample of fitted models, and is relevant to all transit searches. The second flaw is almost computational, and is applicable only searches of very long-period planets, such as the CoRoT and Kepler missions. We propose corrections for both flaws.

Methods. We simulated a large population of transit signals, recovered the KZM results and re-interpret the results as a large set of fitted orbits. We then apply the proposed correction to the main flaw to publicly available real data – analyzed with and without implanted transits.

Results. We show that including the proposed corrections allows to increase the Signal Detection Efficiency (SDE) metric, to improve the detectability of near-threshold signals, and to improve the computational efficiency of searches for long-period planets. Correcting the flaws is easy and require few computational steps.

Poster presentations

P-III-37

TRANSIT COLOR CHANGES IN COROT CANDIDATES

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The host stars of exoplanets exhibit a time-dependent color change during transit that is distinct to those produced by eclipsing binaries, blended or otherwise. Such a color signature is clearly visible in one of the confirmed CoRoT candidate and is present but blended in others. While some unblended candidates can be classified immediately by inspection, we present a technique to perform a detailed analysis of the blended light that can reveal color signatures in other candidates. At present, this technique works bes on particularly bright and deep candidates, but the recent improvement to the jitter model promises to expand the subset of the candidate list for which this technique is viable.

Poster presentations

P-III-38

COMBINING PLANETARY TRANSITS WITH OTHER DETECTION METHODS

J. Schneider, Luth (Meudon, France)

I will show what benefits one can obtain by combining planetary transits with microlensing and very high angular resolution approaches of exoplanet detection.

Poster presentations

P-III-39

FITTING MULTI-PLANET TRANSIT MODELS TO COROT TIME-DATA SERIES BY EVOLUTIONARY ALGORITHMS

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SESSION IV:
Seismology of intermediate mass stars

Oral communications
O-IV-16

HD181555 – WHAT DO FIRST COROT DATA REVEAL ABOUT DELTA SCUTI STARS?

E. Michel, A. Team, C. Builders, Observatoire de Paris, (Meudon, France)

HD 181555 is the first delta Scuti star observed during a long run with CoRoT. The analysis of its rich oscillation spectrum is presented here taking advantage of a noise level more than hundred times lower than ever obtained and about 1000 times lower than the main oscillation peaks. It constitutes a unique opportunity to reconsider long standing questions about such pulsators. Do we see high degree modes and to which extent when pushing down the noise level? Do the amplitudes of the peaks reveal characteristic distributions suggesting the existence of some mode selection mechanism? Does this rich spectrum reveal regular features associated with rotational splitting? Do we see significant mode amplitudes variations over 5 months? We use this unique set of data to consider these different questions.

Oral communications
O-IV-17

HD 50844: A NEW LOOK TO DELTA SCUTI STARS FROM SPACE

E. Poretti (1), E. Michel (2), R. Garrido (3), L. Lefevre (2), L. Mantegazza (1), M. Rainer (4), E. Rodriguez (3), W. Zima (5), A. Baglin (2), M. Auvergne (2), C. Catala (2), R. Samadi (2), F. Baudin (6), P. Amado (3), S. Martin-Ruiz (3), M. Paparo (7), P. Papics (7), M. Alvarez (8), K. Uytterhoeven (9), et al. (10)
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The ground-based photometric time series of the Delta Scuti star FG Vir allowed us to detect up to 75 frequencies (Breger et al.,2005) on the basis of multisite campaigns spanning several years. MOST photometry from space detected 88 frequencies in the light curve of HD 209775 (Matthews et al., 2007) in a 44-d almost continuous run. CoRoT is imparting a strong acceleration in the number of the detected frequencies. The analysis of the data obtained on HD 50844 (V=9.1, observed in the IR01) shows us that we need several hundreds of excited modes to explain the very dense power spectrum observed in the Delta Scuti frequency domain. The amplitude of the noise is down to the 10^{-5} mag level. The comparison with the spectroscopic frequencies (observations performed in the ESO Large Programme 178.D-0361) greatly helps in the mode identification and in the verification of the effectiveness of the cancellation effects in the high l-degree modes.

Oral communications
O-IV-18

ANALYSIS AND MODELLING OF THE DELTA SCUTI STARS ID7528 AND ID7613

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Here we present the study of two CoRoT targets, ID7528 and ID7613 with some of the most recent tools for analysis and modelling of these two delta Scuti stars. Modelling includes effects of rotation and non-adiabatic stability calculations. Equilibrium models have been constructed using the CESAM code, GraCo for non-adiabatic effects and FILOU for rotation effects on the oscillation calculations.

Oral communications
O-IV-19

FREQUENCY ANALYSIS OF THE SISMO FIELD GAMMA DORADUS STAR: HD 49434

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The star HD 49434 has been confirmed as a gamma Doradus star from ground based data (Uytterhoeven et al. 2008). Preliminary analysis of the CoRoT light curves reveals the presence of some hundreds of formally significant frequencies. The reliability of a number of these peaks is at present subject of study. The two photometric frequencies detected in U08 are confirmed in our work, together with some other already suggested in that work by photometry too. Moreover, the majority of the frequencies spectroscopically detected in U08 are also confirmed in the present work.

Oral communications
O-IV-20

ASTEROSEISMOLOGY OF INTERMEDIATE-MASS STARS IN NGC2264 - FIRST RESULTS

K. Zwintz (1), A. Kaiser (1), M. Gruberbauer (1), E. Alfaro (2), C. Aerts (3), P. Amado (2), J. Ballot (4), T. Böhm (4), R. Garrido Haba (2), M. J. Goupil (5), T. Kallinger (1), M. Marconi (6), J. Marques (7), M. Monteiro (8), F. Pinheiro (9, 10), V. Ripepi (6), E. Rodriguez (2), I. Roxburgh (11), A. Thoul (12), S. Turck-Chieze (13)

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In March 2008, the first CoRoT Short Run in the anticenter direction (SRa01) was devoted to the young open cluster NGC 2264. Four main scientific topics are addressed using these observations: (i) the interaction of young stellar objects with their circumstellar material, (ii) rotation and activity, (iii) asteroseismology of intermediate-mass stars, and (iv) planetary and stellar eclipses. Here, the first results of the subteam working on asteroseismology of the intermediate-mass members of NGC 2264 will be presented. The cluster NGC 2264 is younger than 10 Myr, hence all objects with
spectral types later than B9 have not reached the zero-age main sequence (ZAMS) yet, i.e., they are in their pre-main sequence (PMS) phase. The intermediate-mass A and F type PMS stars can become pulsationally unstable while still contracting towards the ZAMS. As pre- and post-main sequence stars of same effective temperature, luminosity and mass differ mostly in their interiors, asteroseismology can be used to constrain the evolutionary stage of a pulsating star. Data for 136 cluster stars fainter than V = 11 mag and with spectral types between mid A and late F were obtained during SRa01 in the exoplanet-channel. They are the main targets for PMS asteroseismology. Several new PMS pulsators could be discovered with the CoRoT data even at very low amplitudes. Results of their pulsational analysis, their location in the Hertzsprung-Russell and cluster color-magnitude diagrams and their impact for asteroseismology will be discussed.

Oral communications

O-IV-21

MAGNETIC AND CHEMICAL STRUCTURE OF THE COROT CP TARGET STAR HD 50773

T. Lueftinger (1), W. Weiss (1), M. Aurière (2), H. E. Fröhlich (3), P. Petit (2), E. Alecian (4, 5), C. Catala (5), J. F. Donati (6), M. Gruberbauer (1), T. Kallinger (1), O. Kochukhov (7), N. Nesvacil (1), T. Roudier (2)

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We present detailed modeling of the CoRoT chemically peculiar (CP) star HD 50773. This CP star was observed from February to April 2007 by CoRoT for more than 50 days with unprecedented quality. The light curve shows clear variations with the rotation of the star, most likely linked to variations of the magnetic field and pronounced elemental surface abundance variations. With this light curve it was possible to precisely determine the rotational period of the star. Using a Bayesian approach to star-spot modelling we derived longitudes, latitudes, and radii of three different spot areas. Additional parameters like stellar inclination, the spots rest intensity and limb darkening were also determined. The CoRoT observations triggered an extensive ground based spectroscopic and spectropolarimetric observing campaign and enabled us to obtain 22 different high resolution spectra in Stokes parameters I and V. The spectropolarimeters NARVAL (TBL, Pic du Midi), ESPaDOnS (CFHT, Mauna Kea, Hawaii), and SemelPol (AAT, Australia) provided a good coverage of the rotational cycle. Applying the Doppler Imaging and Zeeman Doppler Imaging technique, we could derive the magnetic field geometry of the star and surface abundances of Cr, Fe, Si, Mg, Y, and Ti. We compare in detail our results from the different investigations and prove the advantage of combining highest quality space photometry with ground based spectroscopy.

Poster presentations

P-IV-40

THE DOMAIN OF DELTA SCUTI STARS: COROT IRA01 RESULTS

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We present the first results of determing the delta Scuti population observed during the Initial Run (IRa01) with CoRoT (Baglin A. et al. 2002). From more than 10000 stars observed continuously in the exoplanet-channel during 58 days, 220 stars show pulsation in the delta Scuti domain. For 39 of the 220 stars low resolution classification spectra and Stroemgren uvby photometry was available, thus the fundamental parameters like temperature and surface gravity could be derived. Classical Fourier techniques and least squares multi-sine fits were applied to identify the pulsation frequencies. From pulsation theory the frequency of the fundamental mode could be estimated and compared with the frequencies found in the Fourier analyis in order to separate p-mode delta Scuti pulsation from g-mode gamma Doradus pulsation in the low frequency range. For one star the frequencies and spectroscopy indicates that it is in fact a delta Scuti - gamma Doradus hybrid which is also in agreement with its location in the Hertzsprung-Russell diagram. For additional 48 stars a pair of radial modes could be identified and by comparing with pulsation models it was possible to derive the corresponding fundamental parameters. The location of 87 delta Scuti stars in the HRD was derived using the methods described above and compared to the borders of the classical instability strip.

Poster presentations

P-IV-41

SHORT RUN DATA ANALYSIS OF TWO DELTA SCUTI STARS: HD174936 & HD174966

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We explore in this work the possibilities of short-run CoRoT data for delta-Scuti type stars. Some preliminary results show that some periodicities can be identified in frequency content of the light curves, indicating the existence of features that could be relied to rotation.

Poster presentations

P-IV-42

ANALYSIS OF THE DELTA SCUTI STAR HD49294

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We present the analysis of the star HD49294 which was observed by the CoRoT satellite for 141 days about a year ago. Thanks to these unprecedented data, it was discovered to be a variable star and is in fact a typical main-sequence delta-scuti star. A very low noise level of a few 10-6 was achieved for these observations. Considering the low amplitude of the variations exhibited by this star (a few 10-4) it would hardly have been recognized as a variable had it been observed from the ground. This work will focus on the analysis of the rich frequency spectrum that could be harvested from these outstanding data.

Poster presentations
P-IV-43

HD172189: A FURTHER STEP TO FURNISH ONE OF THE BEST LABORATORIES KNOWN FOR ASTEROSEISMIC STUDIES

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HD172189 is a detached eclipsing spectroscopic binary with a rapidly-rotating pulsating component. It is also a member of a well-observed cluster: IC 4756, and, as a selected asteroseismic target of CoRoT's core programme, has recently been the focus of a ground-based observing campaign, simultaneous with the CoRoT space observations. Here we present a fundamental analysis of spectroscopic observations taken prior to becoming a CoRoT target (2005-2007). Due to the complications of determining the radial velocities of two rapidly-rotating stars we have used various methods to extract the radial velocities. These data along with new photometric observations have allowed us to determine the orbital parameters of this system. This work forms a solid foundation for the subsequent analysis of this star with CoRoT data.

Poster presentations
P-IV-44

GAMMA DORADUS IN THE EXOPLANET FIELDS: FIRST INSPECTION

Thematic Team Gamma Doradus , Observatoire de la Côte d'Azur (Fizeau) , Nice , France

About 1000 gamma Doradus candidates are indicated by the CVC in the 4 first runs. Among them, only 32 are recognized as «1st priority» candidate. We undertook a frequency analysis of these 32 stars after some studies concerning trends and jumps. A list of about 10 prime frequencies are derived for each candidate. Most of them will be observed using the Giraffe spectrograph (Neiner et al.).

Poster presentations
P-IV-45

THEORETICAL GAMMA-DORADUS INSTABILITY STRIP AND FIRST COMPARISONS WITH COROT DATA

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The depth and thickness of the convective envelope plays a major role in the driving of gravity modes in gamma Dor stars (Guzik et al. 2000, Dupret et al. 2005). However, convection in stellar modelling is described in a parametric way (mixing length theory MLT) and the depth of the convective envelope depends on the choice of the parameter alphaMLT. Moreover, the characteristics of stellar convective envelope depend on the physics adopted in stellar modelling, for instance: opacity tables (OP, OPAL), stellar chemical mixture (GN93, AGS05), transport processes such as overshooting, macroscopic and turbulent diffusion...
In this poster we present new computations of instability strips, using the Time-dependent Convection treatment of Grigahcene et al. (2005). We study their dependence on the physics used in the modelling, and present a preliminary comparison between theoretical instability strip and the gamma Doradus detected by CoRoT.

Poster presentations
P-IV-46

PRELIMINARY RESULTS FOR HGMN STARS FROM COROT OBSERVATIONS

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HgMn Chemically Peculiar stars are among the quietest stars of the main-sequence. However, according to theoretical predictions, these stars could have pulsations related to the very strong iron peak elements overabundances which are produced by atomic diffusion in upper layers. Such pulsations have never been detected from ground based observations. A few faint stars, which present typical characteristics of HgMn stars, were observed by the CoRoT satellite during the run LRa01, with the exoplanets CCD's (Additional Program). We present here the results for the brightest of these stars.

Poster presentations
P-IV-47

THE COROT CP TARGET STAR HD 171586

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First results from the CoRoT light curve in relation to the ground based spectroscopic campaign. We propose to present light curve variations, linked to stellar rotation, in relation to spectrsocopic modeling of the CoRoT chemically peculiar (CP) star HD 171586. This star was only recently observed by CoRoT, and during a ground based spectroscopic campaign, using the instruments SOPHIE (OHP, France), FOCES (Calar Alto, Spain), and FEROS (ESO, La Silla, Chile), it was possible to obtain more than 40 high resolution spectra. From this data it is obvious, that elements like Fe, Ca, and Mn are clearly variable over the stellar surface. We derive stellar fundamental parameters like Teff and logg, precisely determine the stellar rotational period using the CoRoT data and relate the above mentioned elemental changes to the light curve variations observed by CoRoT.

Poster presentations
P-IV-48

PULSATING PRE-MAIN-SEQUENCE CANDIDATE STARS IN DOLIDZE 25

V. Ripepi (1), M. Marconi (1), A. Ruoppo (1), J. M. Alcala (1), E. Covino (1), S. Leccia (1), S. Bernabei (2), T. Boehm (3), C. Catala (4), W. Corradi (5), S. Alencar (5), R. de la Reza (6), C. Chavero (6), S. Degl'Innocenti (7), P. Prada Moroni (7), M. Deleuil (8), F. Favata (9), M. Fernandez (10), J. Gregorio-Hetem (11), J. Lepine (11), M. Monteiro (12), F. Pinheiro (13), F. Palla (14), C. Torres (15), G. Quast (15), K. Zwintz (16), W. Weiss (16)

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Among 28 stars observed by CoRoT in the field of the young, distant open cluster Dolidze 25, a few Pre-Main-Sequence candidate stars were present. We present the data analysis of the CoRoT time series for these stars. The derived frequencies, coupled with the atmospheric parameters derived from preliminary spectroscopic analysis are used to derive the astrophysical parameters of the targets by means of the comparison with proper non-radial pulsation models.

Poster presentations
P-IV-49

EVOLUTIONARY STATUS DETERMINATION FROM DETECTION OF NIR EXCESSES IN THE SEDS

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Aims. The CoRoT Classification Working Group released recently a list of 104 stars initially classified as Delta-Scuti stars. A preliminary study was performed with the objective of identifying those stars in a pre-main-sequence (PMS) evolutionary phase. The final aim is to enlarge the number of objects of this type and determine more accurately the limits of their observed inestability strip.
Methods. To obtain the published magnitudes of these stars, a coordinate search have been performed in various catalogues. Spectral energy distributions (SEDs) were built using these magnitudes, and theoretical magnitudes from Kurucz models were fitted in order to find NIR excesses that proved their PMS nature.
Results. The data obtained from the different catalogues are relatively limited to perform a good SED theoretical fit. Nevertheless, 29 out of 104 stars of the original list were found to probably show NIR excess. Halpha spectroscopy was performed for the whole dataset to look for emission

and compare with the SED-determined infrared excesses.

SESSION V:
Planet confirmation, method and results

Oral communications
O-V-22a
THE SMALLEST COROT PLANET
D. Rouan

Oral communications
O-V-22b
COROT'S EXOPLANET HARVEST
H. Rauer, M. Fridlund, the CEST

Oral communications
O-V-23

INITIAL RUN OF COROT: HOW WE LEARNED AND WHAT WE LEARNED

C. Moutou (1), F. Pont (2), R. Alonso (1), F. Bouchy (3)

1 LAM, Marseille, France ; 2 Exeter University, Exeter, UK ; 3 OHP/IAP, Paris, France

CoRoT observations started in Feb 2007 with a 45-day run that led to the discovery of 2 hot-Jupiter exoplanets, CoRoT-Exo-1 and 4, among about 50 detected transit events. In December 2008, these first 10000 light curves are released to the astrophysical community. We want here to present our skills of identifying the scenario behind each planetary-like detected event. The community of CoRoT/exoplanet hunters took the opportunity of this relatively short inital run to experiment the lightcurve analysis, event ranking and follow-up observation procedures, with characteristics that are specific to a space-based survey. We will report on our learning experience and on the output of complementary observations for this initial run. The characterization of exoplanets CoRoT-Exo-1 and 4 will also be discussed, on the basis of new data that were collected after their published discovery.

Oral communications
O-V-24

THE PHOTOMETRIC FOLLOW-UP OF COROT PLANET CANDIDATES

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1 Instituto De Astrofísica De Canarias, La Laguna, Spain ; 2 - C. P. F. U. T.

Ground-based photometric follow-up plays an important role in the characterization of planet candidates found by the CoRoT spacecraft. Its principal raison d'e arises from the much higher spatial resolution of common ground-based telescopes in comparison to CoRoT's cameras. This allows the recognition of many transit candidates as arising from eclipsing binaries that are contaminating CoRoT's lightcurves. For the efficient performing of the ground observations, the technique of 'on'-'off' photometry has been developped, in which only a short timeseries during a transit and a section outside a transit is observed and compared photometrically. During the two years of CoRoT's operation, candidates transits have been observed by the CoRoT Photometric Follow-Up Team with telescopes of sizes ranging from 1 to 4m. About 40% of the observed planet candidates have been identified as being caused by contaminating eclipsing binaries. Several examples from this work will be shown and an overview over the identified contaminants been given. Experiences and techniques from this work may also be of interest to other ground or space-based transit-detection experiments in which the discovery data are obtained by instruments with a low spatial resolution.

Oral communications
O-V-25

RADIAL VELOCITY FOLLOW-UP OF COROT CANDIDATES : STRATEGY, FACILITIES AND RESULTS

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Radial velocity follow-up is essential to establish or exclude the planetary nature of a CoRoT transiting companion as well as to accurately determine its mass. We present some elements of the Doppler follow-up strategy in the CoRoT project, based on high-resolution spectroscopy facilities, devoted to the characterization of transiting candidates. Some results are presented in order to illustrate the strategy used to deal with the zoo of transiting candidates.

Oral communications
O-V-26

SPECTROSCOPIC ANALYSIS FOR THE COROT PLANET HOST STARS

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1 Laboratoire D'astrophysique de Marseille, Marseille, France ; 2 Esa, Noordwick, The Nethterlands ; 3 Institute Of Astronomy, Sidney, Australia; 4 Thüringer Landessternwarte Tautenburg, Tautenburg, Germany

The radius and mass of transiting exoplanets are key parameters that give crucial information about their nature and insights into their internal structure. To determine the absolute planetary masses and radii, reliable estimates of the mass and radius of the parent star are needed. In addition, the characteristics of the star (mass, temperature, metallicity) can help interpreting the large range of properties of the growing population of close in planets, and give further insight about planetary formation and evolution. In this paper, we will review the methodology used for determining the fundamental parameters of the host stars of the CoRoT planets. This analysis relies on detailed spectroscopic analyses of high resolution, high signal-to noise spectra. The masses and radii of the host stars are inferred by comparison with stellar evolution models. We use the spectroscopic temperature and metallicity of each star and either the spectroscopic surface gravity or the stellar density, directly measured from the light curves of the transiting planets. Such analyses are particularly important for candidates which cannot be fully characterized by radial velocity measurements, such as fast rotators, allowing us to investigate the planetary nature of the transiting body.

Oral communications
O-V-27

VLT HIGH-PRECISION TRANSIT PHOTOMETRY FOR COROT PLANETS

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We present high-precision transit photometry of several CoRoT planets obtained with the VLT and its FORS1 and FORS2 instruments. We use these new light curves in combination with CoRoT photometry and high-precision radial velocity measurements to improve the characterisation of these planets.

Oral communications
O-V-28a

MULTI-OBJECT SPECTROSCOPY IN THE COROT LRA01 FIELD: THE STELLAR CONTENT IN THE ANTI-CENTER DIRECTION

D. Gandolfi (1), E. Guenther (1), M. Deleuil (2), A. Hatzes (1), J. C. Gazzano (2), S. Aigrain (3), M. Barbieri (2), F. Cusano (1), M. Esposito (4), C. Moutou (2), Y. Unruh (5)

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The space telescope CoRoT is the first space mission devoted to the discovery of extrasolar planets via the transit method using photometric measurements of unprecedented accuracy. Since February 2007, CoRoT is obtaining light curves for thousands of stars in each exoplanet field, with a time-baseline of 25 or 150 days, and at a sampling-rate of 32 or 512 seconds. This superb photometric data-set can be used to study a large variety of different scientific topics as the stellar variability, angular momentum evolution, spot and facular properties, flaring and convention, differential rotation, stellar pulsation, eclipsing binary, etc. However, all these additional science programs of CoRoT can not be achieved without the knowledge of the fundamental stellar parameters of the target stars, i.e. spectral type, luminosity class, and interstellar extinction. With the aim of creating a spectroscopic database complementary to the CoRoT photometric archive, we report on the results of spectroscopic follow-up observations performed by using the FLAMES@VLT and AAOmega@AAO multi-object facilities. Based on the use of a spectral fitting procedure, we derived the fundamental stellar parameters for about 4500 stars in the CoRoT LRa01 field. A general agreement with the Exodat database validates the methods previously adopted to derive spectral type and luminosity class only on the basis of broad-band photometry. However, there are often instances when the photometric determinations of spectral type disagree significantly with the spectroscopic results, probably due to the large extinction suffered by many CoRoT targets. Deriving an accurate spectral type is often a crucial first step in deciding whether to commence radial velocity follow-ups on CoRoT exoplanet candidates, especially on faint ones. A comparison with both previous studies and theoretical predictions on the stellar population of our galaxy is also presented.

Oral communications
O-V-28b

STELLAR POPULATIONS OF THE OBSERVED COROT EXO-FIELDS AND FOR THE FIELD LRC03

M. Barbieri, Laboratoire d'Astrophysique de Marseille, (Marseille, France)

From the beginning of CoRoT observations a total of nine field was observed. We present BVRIJHK photometry from EXODAT catalog of all the observed stars in the CoRoT exo-fields. We have tested the application to these data of the software package ACME, which fits observed magnitude to estimate stellar parameters and distances. Color magnitude, two color, and reduced proper motion diagrams was also studied for each oberved field. Our results shows that the observed stellar populations in CoRoT exo-fields are not different from the typical populations of low galactic latitude fields. One method for increasing the FG dwarf counts is pointing to a direction where an extended dark nebula at 2/3 kpc dimmest the light of the background giants and of Upper Main Sequence stars. We have chose the pointing of the next long run LRc03, respecting this constraint, and we present the stellar content on the basis of ugriz photometry.

Oral communications
O-V-29

EXODAT : EXO-PLANETS INFORMATION SYSTEM : EVOLUTIONS

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H. Deeg (3), Y. Granet (1), C. Moutou (1), C. Surace (1)

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EXODATThe extend searches of exoplanets carried out over large sample of the stellar population raised new needs. A deep investigation in the nature andorigin of the new planet population could be foreseen only on a well-characterized stellar population. EXODAT has been built to prepare the corot exoplanet observations and to provide the grounds for the subsequent statistical analyses of the planetary systems the instrument is going to detect. Last evolutions of EXODAT will be shown and interoperability with Virtual Observatories facilities have been set up.

Poster presentations
P-V-50

TRANSITING EXOPLANETS FROM THE COROT SPACE MISSION VIII COROT-EXO-6B: A GIANT PLANET IN A 9D ORBIT

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CoRoT is the first dedicated space-based exo-planetary transit search. It delivers unprecedented light-curves with continous sampling over periods up to 150 days. In this paper we present the discovery of the transiting giant planet Exo-6b. We use the light curve to perform an analysis of the transit, and determine the rotation period of the star, as well as discerns the activity level. Radial velocity data obtained with the SOPHIE spectrograph are further used to constrain the fundamental parameters of the planet as well as UVES/VLT data to determine the stellar fundamental parameters

Poster presentations
P-V-51

THE TRANSITING EXOPLANET COROT-EXO-5B

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We report the detection of CoRoT-Exo-5b which was detected during observations of the LRa01 field, the first long duration field in the galactic anti-center observed by CoRoT. CoRoT-Exo-5b is a hot «Jupiter-type» planet orbiting a F9V star of 14.0 mag. Details of the planetary and stellar parameters will be given.

Poster presentations
P-V-52

CHARACTERISATION OF A PLANET'S PARAMETERS USING THE ROSSITER-MCLAUGHLIN EFFECT

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The spectroscopic transit is a complementary effect to the photometric transit and allows to check the same parameters with a very different model, breaking down correlations. It also allows to check to the rotation velocity of the star and the obliquity of the orbit. Having various spectroscopic transit is also a direct measure of the activity of the star. We are using Harps data on CoRoT 3 and HD189733 to show the effet of precise measurements of this effect on an overall fit comprising all the spectroscopy and photometry in and out of transit.

Poster presentations
P-V-53

ANALYSIS OF THE COROT RESULTS: STATISTICAL STUDY OF THE UNDERLYING PLANET POPULATION

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The CoRoT satellite data offers an unique opportunity for a precise statistical analysis of a transiting exoplanets survey, due to its well characterized stellar fields of view and high photometric precision. We use the CoRoTlux end-to-end simulator to analyze the yield of the first year of the CoRoT exoplanets observation campaigns. We first simulate a population of stars corresponding to the one observed in CoRoT's first fields, adding companions and background stars as potential blends sources, and assigning them planetary companions. Giant planets assignement is based on discoveries by radial velocity. We use different generic or theoretical models to simulate the unknown period-mass-radius distribution of close-in sub-giants and SuperEarths size planets. We use a detailed investigation of light-curves and an a-posteriori analysis of the data pipeline to respectively characterize effective noise level (Aigrain 2008) and detection threshold (Pont 2008). Comparing our simulation results with the real CoRoT yield allows a better characterization of close-in giant planets distribution, increases our statistical knowledge of stellar blends mimicking transit signals, and provides constraints and upper limits to the underlying close-in small planets population.

Poster presentations
P-V-54

HINTS FOR STAR-PLANET INTERACTION IN COROT-EXO2A

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CoRoT-Exo-2a is a young G7V star accompanied by a transiting hot-Jupiter, recently discovered by CoRoT (see Alonso et al. 2008). As discussed by Lanza et al. (2008), CoRoT-Exo-2a shows rotationally modulated variability due to photospheric magnetic activity. Here we show that the variance of the stellar light curve is modulated in phase with the planet orbital period. This may suggest a possible star-planet magnetic interaction, a phenomenon already seen in other extrasolar planetary systems hosting hot-Jupiters.

Poster presentations
P-V-55

SPECTROSCOPIC ANALYSIS OF A LARGE SAMPLE COROT/EXOPLANET TARGETS USING THE FLAMES INSTRUMENT

J.-C. Gazzano (1), M. Deleuil (1), M. Barbieri (1), P. De Laverny (2), A. Recio Blanco (2), F. Bouchy (3), C. Moutou (1), D. Gandolfi (4), B. Loeillet (1, 3)

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The link between planets and their host star is known to be an open issue in modern extrasolar planet science. Thus, an accurate determination of the physical parameters of the host star is a mandatory step to achieve both a good parameterization of its planets. Besides, in order to understand the planetary formation conditions, these stellar parameters must be compared to field parameters.
Two programs of multi-fiber (FLAMES@VLT) spectroscopic observations of the CoRoT/Exoplanet fields with the GIRAFFE spectrometer were performed during the winter 2005 and the spring 2008.
We combined an automated software based on the MATISSE algorithm, originally designed for the GAIA/RVS spectral analysis, to carry out the atmospheric parameters measurement, and equivalent width measurements on the GIRAFFE spectra for individual abundances measurements.
From these observations we derived atmospheric stellar parameter such as the effective temperature, the superficial gravity, which is well constrained thanks to neutral magnesium lines, the overall metallicity, the radial velocities and an estimate of the rotational velocities and individual abundances for some elements.
By comparing the main physical and chemical properties of the host stars to those of the stellar population they belong to, new insights on the formation and evolution of exoplanetary systems and the star-planet connection will be explored.
We studied the kinematics of these CoRoT targets using the radial velocity and the proper motions obtained from stellar catalogues. The results were used to study the metallicity-velocity relation in these CoRoT fields.
The photometry from the EXODAT catalogue and the spectroscopic results was combined to obtain stellar ages from isochrones fit and was explored the age-metallicity and the age-velocity relationships.

Poster presentations
P-V-56

SELECTION OF MOST PROMISING CANDIDATES IN THE COROT MISSION FOR RADIAL-VELOCITY FOLLOW-UP

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We used the method developed by Silva & Cruz (2006), which distinguishes between planetary and stellar companions by fitting transit light curves, to select the best CoRoT candidates for planetary systems to be monitored with radial-velocity measurements. Applying this model, that uses equations like the Kepler's third law and a mass-radius relation for main sequence stars, we are able to estimate mass and radius of the primary and secondary objects, and thus select, among several transit light curves observed during the CoRoT mission, the most promising candidates likely to host a planet-like companion. Tests using such a method applied to the light curves of confirmed CoRoT exoplanetary systems show that the estimated radius for such planets is smaller than or of the order of 1.5 Jupiter radius and the companion mass is less than 0.1 solar mass, while for most of the light curves in which no planet has been detected the secondary companion has an estimated radius larger than 1.5 Jupiter radius and mass larger than 0.1 solar mass.

Poster presentations
P-V-57

SPECTROSCOPIC DETERMINATION OF PHYSICAL PARAMETERS OF STARS IN PLANETARY SYSTEMS

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We used spectroscopic observations to determine Teff and log g for 89 objects from Schneider\'s catalogue of central stars in planetary systems. Measurements were performed at Brazilian Laboratorio Nacional de Astrofisica with the same spectrograph + telescope configuration and constitute probably the biggest homogeneous , moderate resolution spectroscopic stellar data base of Schneider's catalogue. Physical parameteres were obtained by comparison between observed spectra and a library of synthetic spectra from Coelho et al. (2005).

Poster presentations
P-V-58

ATMOSPHERIC STUDY OF THE YOUNG COROT-EXO-2B PLANET WITH SPITZER

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CoRoT−Exo−2b is the second transiting planet discovered by CoRoT. The 150 days long photometric time series and the spectral analysis of the host star suggest that this G7 dwarf is still close to the ZAMS and is thus younger than 0.5 Gyr. With a planetary radius of 1.465 ± 0.029 RJup, a mass of 3.31 ± 0.16 MJup, the deduced planet density is very close to the value for Jupiter. This is rather surprising because massive planets are supposed to get rapidly a radius comparable to Jupiter one. It is tempting to propose that the small density of CoRoT−Exo−2b is due to its very young age: this planet would still be cooling. Unlike the 3 other known massive transiting planets, the very large stellar flux received by CoRoT−Exo−2b clearly puts it in the 'pM' class proposed by Fortney et al, and one should expect very deep IR secondary eclipses for this planet. We present in this study measurements of its secondary eclipse obtained with Spitzer in 4.5 and 8-microns channels that provide a unique opportunity to study the atmosphere of a massive planet in an early phase of its evolution. These measurements also constraint the heat distribution efficiency and chemical composition (CO and water) of the atmosphere. Furthermore, secondary eclipses timing put constraints on the orbit eccentricity better than from radial velocity measurements especially because the host star is quite active. This allows us to discuss the rate of tidal energy dissipation in this young planet.

Poster presentations
P-V-59

STELLAR METALLICITIES AND PLANET MIGRATION IN COROT-EXO SYSTEMS

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Both, a metal enhancement or the presence of a gradient of the stellar elemental abundances as a function of their condensation temperatures, can be a signature of the effect of a bombarding of planetesimals due to the internal migration of a planet during the first 20 - 30 Myr (Winter et al. 2007 MNRAS.378, 1418, and 2008 in preparation). Using these tools and with the help of recent obtained high resolution FEROS spectra of CoRot-Exo 2a and 4a and results from the literature for CoRoT-Exo 3a, we investigate the early history of these three systems. We hope that this methodology can bring some light particularily on the problem of CoRoT-Exo 3b. A superplanet or a brown dwarf?

SESSION VI:
Seismology of hot stars

Oral communications

O-VI-30

THE BETA CEPHEI STAR HD 180642: FULL INTEGRATION OF COROT AND GROUND DATA FOR MODE IDENTIFICATION

M. Briquet (1), K. Uytterhoeven (2), C. Aerts (3), T. Morel (4), P. De Cat (5), A. Miglio (4), P. Mathias (6), K. Lefever (3), E. Poretti (7), S. Martin-Ruiz (8), M. Paparo (9), M. Rainer (7), F. Carrier (3), J. Gutierrez-Soto (10), J. C. Valtier (6), J. M. Benko (9), Z. Bognar (9), P. J. Amado (8), J. C. Suarez (8), C. Rodriguez-Lopez (8), R. Garrido (8)

1 Instituut Voor Sterrenkunde - Katholieke Universiteit Leuven, Leuven, Belgium ; 2 Instituto De Astrofisica De Canaria, La Laguna, Spain ; 3 Instituut Voor Sterrenkunde - Katholieke Universiteit Leuven, Leuven, Belgium ; 4 Institut D'astrophysique Et De Geophysique De L'universite De Liege, Liege, Belgium ; 5 Koninklijke Sterrenwacht Van Belgie ; 6 Cnrs, Paris, France ; 7 Inaf-Osservatorio Astronomico Di Brera, Merate, Italy ; 8 Instituto De Astrosica De Andalucia ; 9 Konkoly Observatory ; 10 Observatoire de Paris, Meudon, France

The B1.5 II-III star HD 180642 is the only known Beta Cephei star in CoRoT's core programme. To complement the space data of this target, both ground-based photometric and spectroscopic data were collected, to which we added several archival observations. In this talk, we describe our results from a full integration of CoRoT and intensive ground-based observations. The star is a non-linear dominant radial mode pulsator for which low-amplitude modes are detected for the first time. A few of the latter are observed in our ground-based datasets so that a mode identification for them is possible. To this end state-of-the-art techniques are adapted to be applied to a star with a highly non-linear behaviour of the radial mode. Additionally, a careful interpretation of the CoRoT lightcurve helps to identify the wavenumbers. Besides this outcome, the Van Hoof effect for the dominant mode is investigated and the stellar parameters and chemical abundances are determined. All this information is to be used as additional constraints to the CoRoT pulsation frequencies, for asteroseismic modelling of this Beta Cephei star. Additional abstracts cover the lightcurve modelling of this pulsator (Degroote et al.) as well as seismic modelling (Thoul et al.).

Oral communications
O-VI-31

THE BETA CEPHEI STAR HD 180642: SEISMIC MODELLING

A. THOUL (1), M. BRIQUET (2), P. DEGROOTE (2), A. MIGLIO (1), J. MONTALBAN (1), C. AERTS (2), T. MOREL (1), E. NIEMCZURA (2)

1 University of Liège, Liège, Belgium ; 2 Kuleuven, Leuven, Belgium

HD180642 is the only known beta Cephei star in the core programme of CoRoT. At least 8 frequencies have been clearly detected with CoRoT. It has also been observed photometrically and spectroscopically from the ground, and several of the frequencies detected with CoRoT have been confirmed. Spectroscopic data are essential to provide an identification for the observed modes. The spectrum of HD180642 shows a non-linear very dominant radial mode, while the other modes have low amplitudes. We will present the results of a detailed asteroseismic modelling of this star, performed using the CLES evolution code, and the OSC and MAD oscillation codes. Additional abstracts cover the lightcurve modelling of this pulsator (Degroote et al.) as well as the integration of CoRoT and ground data for mode identification (Briquet et al.).

Oral communications
O-VI-32

SEISMIC ANALYSIS OF HD49330 FROM COROT AND SPECTROSCOPIC DATA

A. L. Huat (1), A. M. Hubert (1), M. Floquet (1), Y. Frémat (2), J. Gutiérrez-Soto (1), C. Neiner (1), L. Andrade (3), B. de Batz (1), P. Diago (4), M. Emilio (5), F. Espinosa Lara (1), J. Fabregat (4), E. Janot-Pacheco (3), B. Leroy (6), C. Martayan (2, 1), T. Semaan (1), J. Suso (4)

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We present the results about the early B0e star HD49330 observed during the first CoRoT long run towards the galactical anticenter (LRA1) and simultaneously from the ground in spectroscopy with Narval@ TBL (Pic du Midi, France) and FEROS@ESO. This Be star is located close to the less luminous limit of the beta Cephei instability strip in the HR diagram and showed a 0.03 mag outburst during the observations. We have found in this star p and g pulsation modes with amplitude variations along the run correlated with the outburst. Moreover, the simultaneous spectroscopy observations allowed the identification of p modes. Thanks to these results, seismic models are currently in preparation.

Oral communications
O-VI-33

FIRST SEISMIC MODELING OF COROT BE STARS

C. Neiner (1), H. Saio (2), C. Lovekin (3), F. Espinosa Lara (1), J. Gutierrez-Soto (1), A. L. Huat (1), M. Floquet (1), A. M. Hubert (1), T. C. B. T. the CoRoT Be team (4)

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The analysis of the first few Be stars observed with CoRoT in its seismology fields revealed many frequency peaks in the power spectra including very low-amplitude ones. Using the results obtained for HD181231 (LRC1), HD175869 (SRC1) and HD49330 (LRA1) from the CoRoT data and ground-based spectroscopy, we performed the first seismic modeling of CoRoT Be stars. To reproduce the observed pulsations of the late Be stars HD181231 and HD175869 it is necessary to include extra mixing (core overshooting or rotational mixing) in the models. The p and g pulsation modes observed in the early Be star HD49330 vary with time and are closely correlated to the outburst which occurred during the CoRoT run, therefore requiring more complex modeling.

Oral communications
O-VI-34

MODE IDENTIFICATION IN RAPIDLY ROTATING STARS

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Recent calculations for rapidly rotating polytropic models and models based on the Self-Consistent Field method (MacGregor et al. 2007) have shown that the frequency spectrum of low degree pulsation modes can be described by an empirical formula similar to Tassoul's asymptotic formula, provided that the underlying rotation profile is not too differential (Reese et al. 2008a, 2008b). Given the simplicity of this asymptotic formula, we investigate how to use it as the basis of a mode identification scheme. This mode identification scheme is then tested on artificial spectra in which the mode identification is known beforehand. We also investigate the effects of adding random frequencies to mimic the effects of chaotic modes which also show up in such stars and are likely to be visible (Lignis and Georgeot, 2008).

Oral communications

O-VI-35

PULSATING B STARS IN COROT'S EXOFIELD DATA: DISCOVERIES, FREQUENCIES AND GENERAL PROPERTIES

P. Degroote (1), A. Miglio (2), J. Debosscher (1), J. Montalban (2), J. Cuypers (3), M. Briquet (1), P. De Cat (3), A. Thoul (2), L. Balaguer-Nunez (4), C. Maceroni (5), I. Ribas (6), A. Noels (2), C. Aerts (1, 7)

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This contribution concerns the Additional Programme of CoRoT, more particularly the study of new pulsating B stars discovered in the CoRoT exofields. Such stars have been identified by the CoRoT Variability Classifier (Sarro, this conference). The first results of the light curve analysis of the many new pulsating B stars are presented, while we refer to Neiner (this conference) fora similar study of the Be stars in the exofields. We report many new and clear Slowly Pulsating B stars, which allows to study the pulsational properties of these gravity-mode oscillators as a group rather than per individual star as had to be done before the CoRoT mission. We show where these stars are situated with respect to the theoretical instability strip and find full agreement between theory and observations. We emphasize that the time scales of variations detected in the CoRoT lightcurves is often insufficient to assign new pulsators to known classes in an unambiguous way. We report several cases where the combination of the lightcurve and fundamental parameters derived from ground-based Stromgren photometry are difficult to interpret in terms of previously known pulsation classes of stars with kappa-driven modes, which seems to point to the discovery of new classes or subclasses.

Poster presentations

P-VI-060

THE ASTEROSEISMIC GROUND-BASED OBSERVATIONAL COUNTERPART OF COROT

K. Uytterhoeven (1), E. Poretti (2), P. Mathias (3), P. Amado (4), M. Rainer (2), C. Catala (5), C. Maceroni (6), I. Ribas (7), S. Martin-Ruiz (4), C. Neiner (5), M. Paparo (8), K. Pollard (9), E. Rodriguez (4), CoRoT/SWG Ground-Based Observations Working Group (10)

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10 all participating institutes

A huge observational effort is undertaken by the CoRoT/SWG Ground-Based Observations Working Group to complement the CoRoT space data with simultaneous ground-based data to guarantee an optimal scientific outcome of the asteroseismic part of the CoRoT mission. Large Programme and normal observing proposals have been applied for, and have been approved, for the monitoring of asteroseismic CoRoT targets with several high-resolution spectrographs, multi-colour photometers and spectropolarimeters at several observatories. Also support observations of seismic targets in the exo-planet fields are provided for. We will give an overview of the observational efforts, present some of the ground-based results, and give an outlook to the future.

Poster presentations

P-VI-61

CHARACTERIZATION OF COROT VARIABLE STARS WITH FLAMES AND STATISCAL STUDY OF PULSATIONS OF BE STARS

T. Semaan

Poster presentations

P-VI-62

THE BETA CEPHEI STAR HD 180642: ANALYSIS OF THE COROT LIGHT CURVE

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High precision photometry has been obtained by CoRoT for the known Beta Cephei star HD 180642, a main target in the asteroseismology channel. The resulting highly sampled lightcurve has proven to contain a wealth of information, most of it previously undetected. Its dominant radial mode shows to be highly nonlinear, manifested through harmonics, combination frequencies and time-variability in its amplitude and phases. Besides the high amplitude of this dominant mode, many other features are visible which have not been clearly detected before: additional low-amplitude pulsation frequencies, long term variability, variability features on a time scale of the order of the total timespan of the light curve, etc.

In this work, we present a detailed frequency analysis and light curve modelling of this primary CoRoT target. Additional abstracts cover the mode identification of this pulsator from ground-based multicolour photometry and spectroscopy (Briquet et al.) as well as seismic modelling (Thoul et al.).

Poster presentations
P-VI-63

BETA CEPHEI STARS IN THE LOCAL PART OF THE GALAXY

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1 Instytut Astronomiczny, Wroclaw University, Wroclaw, Poland; 2 Warsaw University Observatory, Warsaw, Poland

A recent analysis of the All Sky Automated Survey (ASAS) observations south of δ = +28° resulted in the discovery of about 300 β Cephei stars, bringing the total number of stars of this type to nearly 400. This number and the homogeneity of the sample they were extracted from, allows some statistical considerations concerning their pulsational properties and location. Most of them are located within 3 kpc from the Sun and trace a very young population of stars in the the local part of the Galaxy. We study their distribution with respect to the position of known star-forming regions, OB associations and spiral arms. Some β Cephei stars from the analysed sample are located at high Galactic latitudes. They are good candidates for runaway stars from star-forming regions and key objects for the verification of the hypothesis of star formation far from the Galactic plane. The pulsation properties of the subsamples of β Cephei stars located in different parts of the Galaxy are also summarized and compared.

Poster presentations
P-VI-64

A COMPLEX ASTEROSEISMIC ANALYSIS OF THE BETA CEPHEI STAR THETA OPHIUCHI

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We present an example of a complex asteroseismic study of the β Cephei star θ Ophiuchi. This star was recently a subject of photometric and spectroscopic investigations and the results were published by Handler et al. (2005) and Briquet et al. (2005, 2007), respectively.
Combining these two sets of observations, we apply the method of Daszy\'nska-Daszkiewicz, Dziembowski, Pamyatnykh (2003, 2005) which consists in simultaneous determination of the ℓ degree and the nonadiabatic f parameter of a pulsational frequency, ν. The f parameter describes the ratio of the radiative flux perturbation to the radial displacement and results from nonadiabatic computations of stellar pulsation. The method allows to circumvent uncertainities in mode identification coming from this input. Moreover, a comparison of theoretical and empirical f values yield additional constraints on stellar parameters and input physics.
The aim of the complex asteroseismic analysis is to find a stellar model which fits both oscillation frequencies and corresponding f parameters. The value of f is determined in subphotospheric layers which are poorly probed by the frequencies. Therefore these two asteroseismic tools (ν,f) are complementary to each other and treating them simultaneously can improve seismic modelling of stars.

Poster presentations
P-VI-65

GSC06272-01557, THE FIRST BETA CEPHEI STAR DISCOVERED WITH MOST

V. Antoci (1), G. Handler (1), R. Kuschnig (1), J. M. Matthews (2)

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The Beta Cephei star GSC06272-01557 is the first of its class discovered by the MOST satellite. Rough analyses of a 30 days long data set have already revealed 9 frequencies, further ones cannot be excluded. Recent measurements of the Stromgren indices attribute a Teff around 24500 K and a log g of 3.9, which places the star in the middle of the Beta Cephei instability strip. Multicolor photometry from ground based observations enable us to identify the modes of pulsation.

Poster presentations

P-VI-66

TIME-FREQUENCY ANALYSIS OF LIGHT CURVES OF COROT BE STARS

B. Leroy (1), M. Emilio (2), Y. M. Kuzicz (2), L. Andrade (3), B. de Batz (4), P. D. Diago (5), F. Espinosa Lara (6), J. Fabrega (5), M. Floquet (6), Y. Fremat (7), J. Gutierrez-Soto (6), A.-L. Huat (6), A.-M. Hubert (6), E. Janot-Pacheco (3), C. Martayan (7, 6), C. Neiner (6), T. Semaan (6), J. Suso (5), J. C. Ferreira da Rocha (2)

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Several of the light curves of the Be stars observed with CoRoT so far show clear evidence of departures from stationarity (and perhaps also from linearity), even in the absence of outburts. The meaningful information that can be extracted from the light curves with the help of traditional spectral techniques that assume linearity and/or stationarity (like Fourier analysis) is therefore limited. The Hilbert-Huang transform technique makes no such an assumption. In a first step, the signal is adaptively decomposed into a set of oscillatory components whose amplitude and frequency vary over time (this is the so-called Empirical Mode Decomposition); in the course of this process, the first component contains the highest frequencies associated with the signal, whilst the subsequent ones contain lower frequencies. In the second step, the Hilbert transform is used to extract from the obtained components instantaneous amplitudes and frequencies. Such an analysis produces a dynamical picture in the form of a three-dimensional plot whose axes are time, frequency and amplitude. We present preliminary results obtained by applying that technique to the analysis of several light curves of CoRoT Be stars.

Poster presentations

P-VI-67

ANALYSIS OF COROT BE STAR 102761769

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We analyzed 54.6 days of Ira01 data of this B5-6 IV-Ve CoRoT target. One low-resolution spectroscopic observation of the star was also made at La Palma observatory. The stellar rotation was estimated to be greater than 300 km/s from the Fourier transform of spectral lines. Time series analysis using CLEANEST and SSA algorithms show two dominant frequencies at 2.465 c/d and 2.441 c/d that are probably part of a multiplet.The critical rotation frequency of a typical B5-6 star is about 3.5 c/d, suggesting that the above frequencies are really due to stellar pulsations rather than linked to the star´s rotation.

Poster presentations

P-VI-68

ANALYSIS OF THE BE STARS 102964342, 102725623 AND 102719279 OBSERVED IN THE EXOPLANET FIELD OF COROT

J. Gutierrez-Soto (1), P. Diago (2), J. Fabregat (2), J. Suso (2), C. Neiner (1), The CoRoT Be Team (1)

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Be stars are non-supergiant B-type main sequence stars whose spectrum has or had at some time one or more Balmer lines in emission. These massive stars are fast rotators which may pulsate as β Cephei or SPB stars. More than 10 Be stars were observed in the exoplanet field of CoRoT during the initial run (IR01 - from February to April 2007) for 57 days. We present a detailed analysis of the CoRoT light curves for 3 Be stars namely 102964342, 102725623, 102719279. Multiple frequencies have been detected in these stars. Pulsations, outbursts, beating phenomenon, rotation, amplitude variability, etc... have been found in their light curves.

Poster presentations
P-VI-69

GROUND-BASED SPECTROSCOPIC OBSERVATIONS OF THE B0.5 IVE BE COROT TARGET HD49330

Michele Floquet (1), A. L. Huat (1), A. M. Hubert (1), E. Poretti (2), P. J. Amado (3), C. Catala (4), M. Rainer (2), J. Gutierrez-Soto (1), B. De Batz (1), Team CoRoT Be (1), K. Uytterhoeven (5)

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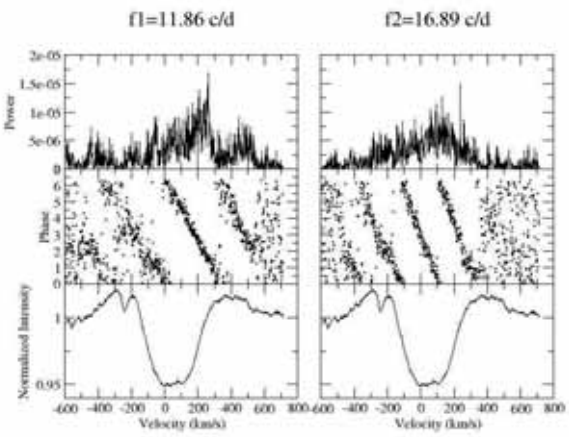
We report on ground-based spectroscopic observations of the Be target HD49330, which were simultaneously obtained with the CoRoT LRA1 run in the seismology field. This early type Be star (B0.5IVe) was observed with NARVAL@TBL (France) and FEROS@2.2m (ESO) just before the outburst depicted in the CoRoT light curve.
Mid-term variability has been detected in the double emission component of the first Balmer lines as well as in the stronger red lines of HeI. Its behaviour and origin is shortly discussed.
Short term variability is present in all Balmer, HeI and metallic lines and we have been able to detect and study the main frequencies: 11.86 c/d (137.22 micro Hz) (see Figure for HeI 6678), 16.89 c/d (195.42 micro Hz)(see Figure for HeI 6678), 5.27 c/d (60.97 micro Hz), 3.66 c/d (42.35 microHz) and 1.30 c/d (15.04 microHz). These frequencies can be interpreted in term of non radial pulsations. Phase and power distributions allow the identification of p modes with l = 5 and 6 for f=11.86 c/d and f=16.89 c/d respectively, and g modes with lower l values for the other frequencies.
This identification will be useful for the interpretation of the CoRoT results and seismic models of HD49330.



Poster presentations
P-VI-70

HD50747 : ANALYSIS OF COROT DATA

Noël DOLEZ (1), S. Vauclair (1), E. Michel (2), A. Hui Bon-Hoa (3), G. Vauclair (3), D. Le Contel (4), P. Mathias (4), E. Poretti (5), M. Rainer (5), R. Samadi (2), K. Uytterhoeven (6), J.-C. Valtier (4)

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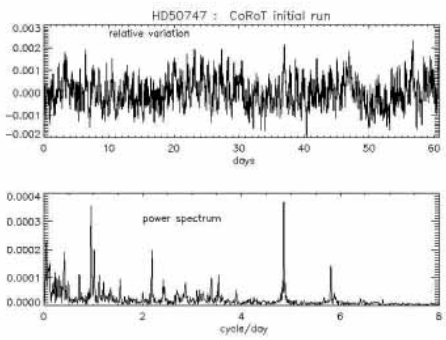
HD50747 has been observed in the asteroseismology field of CoRoT during the initial run.
From pre-CoRoT observations, some characterisics of the star are known : it is classified as A4 IV with an effective temperature of 7780K and an absolute magnitude of -0.4. The spectra show complex line profiles, with two narrow components belonging to a binary, and a broad component from a third star . This could be interpreted as a triple system, with two close components and a third, much brighter star responsible for at least 80% of the total luminosity of the system. The orbital period of the two close components is 9.24 days and their mass ratio 1.41. the third star presents no radial velocity variation.
The CoRoT light curve shows clearly variations, with an amplitude of about one thousandth of the total luminosity (see figure). The Fourier transform (see figure) exhibits many frequencies. The two main peaks are at 4.86 and 0.96 cycle/day. We made an analysis of the data, using pre-whitning method (via the Period04 code). We found at least 20 significant frequencies, but no one above 6 c/d, except for peaks due to the spectral window of the observations.
The basic question is: which star is the variable, and which type of variable is it? The brightest component is probably excluded, as it falls apparently out of any known variability region in the H-R diagram. So the best candidate is the most massive of the two close components. Unfortunately, it is very difficult from the composite spectrum of the system to determine precisely the parameters of this object. From the range of observed periods, one propose that this star is a mixed delta-scuti gamma-doradus star. But it is still not excluded that two variables exist in the system.



Poster presentations

P-VI-71

THE BE STAR HD 50209: RESULTS FROM THE SEISMOLOGY FIELD DATA

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We present an overview of the data analysis of the B8IVe star HD 50209 observed by the CoRoT satellite. Be stars are non-supergiant B-type main sequence stars whose spectrum has or had at some time one or more Balmer lines in emission. Be stars are known as fast rotators which may pulsate as $beta$ Cephei or SPB stars. HD 50209 has been observed during the LRA1 (136 days) in the seismology field of CoRoT. We have detected more than 50 significant frequencies, that is much larger than those found in other B8e stars. The three main frequencies show important changes in their amplitudes, which ranges from 0.7 to 3.3 mmag along the observed time-line. Moreover, we can observe the corresponding beating frequencies. In order to complement this study, ground-based spectroscopic data have been analysed for this star. A preliminary seismic modelling of this pulsating late-type Be star will also be presented.

Poster presentations

P-VI-72

A SPECTROSCOPIC SURVEY OF B-TYPE STARS IN THE COROT FIELDS

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The CoRoT satellite is collecting precise time-resolved photometry for a large number of B-type stars and these data will be used to perform the seismic modeling of these objects. The atmospheric parameters, chemical composition and rotational velocities of these targets are necessary for a proper interpretation of the space data. One of the main goals of the ground-based support program for the CoRoT mission was to obtain spectroscopic data for stars in the fields monitored by the satellite. The observations are collected in the GAUDI archive, which contains high-resolution spectra for more than 200 B-type stars.

To analyze the whole sample, two different methods were used. For B6-B9 stars, Teff was derived from photometry and logg from Balmer lines. To derive the LTE chemical abundances and rotational velocities, spectrum synthesis methods were used. For the B0-B5 stars, we opted for a hybrid approach making use of classical LTE atmospheric models but with a full NLTE treatment to compute the population numbers and synthetic spectra. The effective temperature was determined from the Si ionization balance and the surface gravity from Balmer lines. In order to optimize the other parameters, we minimized the differences between observed and theoretical spectra using classical least-squares fitting methods.

We determined the atmospheric parameters, chemical abundances and rotational velocities for about 150 stars. Most of the stars have rotational velocities of about 90 km/sec. There is a small sample of stars with V sini values lower than 20 km/sec. The average iron abundance is typical for B-type stars in solar neighbourhood. The analysis of this sample of B-type stars reveals many chemically peculiar stars, 20 of them unknown prior to our study.

Poster presentations

P-VI-73

PULSATING B STARS IN COROT'S EXOFIELD DATA: DISCOVERIES, FREQUENCIES AND GENERAL PROPERTIES

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This contribution concerns the Additional Programme of CoRoT, more particularly the study of new pulsating B stars discovered in the CoRoT exofields. Such stars have been identified by the CoRoT Variability Classifier (Sarro, this conference). The first results of the light curve analysis of the many new pulsating B stars are presented, while we refer to Neiner (this conference) for a similar study of the Be stars in the exofields.
We report many new and clear Slowly Pulsating B stars, which allows to study the pulsational properties of these gravity-mode oscillators as a group rather than per individual star as had to be done before the CoRoT mission. We show where these stars are situated with respect to the theoretical instability strip and find full agreement between theory and observations.
We emphasize that the time scales of variations detected in the CoRoT light curves is often insufficient to assign new pulsators to known classes in an unambiguous way. We report several cases where the combination of the light curve and fundamental parameters derived from ground-based Stromgren photometry are difficult to interpret in terms of previously known pulsation classes of stars with kappa-driven modes, which seems to point to the discovery of new classes or subclasses.

Poster presentations

P-VI-74

COROT'S VIEW ON STRANGE-MODE OSCILLATIONS: THE CASE OF THE B6I SUPERGIANT HD 50064

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Stellar evolution theory is most uncertain in the very upper part of the Hertzsprung-Russell Diagram. It would therefore be highly beneficial to perform asteroseismology for the most massive stars. Unfortunately, evolved stars of high mass have hardly been the subject of seismic inference because the observational establishment of their oscillations is much harder than for stars in other classes, due to occurrence of a strong stellar wind and several kinds of instabilities in their atmospheres. Moreover, our theoretical understanding of their oscillations is far less detailed than for lower-mass stars for which radiation-driven mass loss can be ignored. A dichotomy seems to occur between the excitation of gravity modes by the kappa mechanism (Lefever et al. 2007), and strange mode oscillations due to non-adiabatic effects in high L/M stars (Glatzel et al. 1999). With this poster, we take the first step towards the interpretation of the variability of the B6I supergiant HD 50064 observed by CoRoT in its seismology programme. The CoRoT light curve of this star reveals strange-mode instability while gravity modes seem to be absent. We unravel the light curve characteristics of this late-B supergiant and perform as well a data analysis on new high-resolution spectroscopy to derive the fundamental and wind parameters. Subsequently, we compute theoretical models in agreement with these parameters in order to check the presence of a narrow trapping region in the outer layers and to estimate the frequency of the strange modes associated with that cavity.

Poster presentations
P-VI-75

SLOWLY PULSATING B STARS IN THE COROT SISMO FIELDS

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The variability of Slowly Pulsating B stars is interpreted as being due to high-order g modes pulsations excited by the κ-mechanism. SPBs are promising targets for asteroseismology as their pulsation modes are very sensitive probes of the near-core structure, and as the theoretical explanation of their instability strip allows testing the behavior of opacity in the stellar interior.
However, one of the limiting factors of asteroseismology of SPB stars has been the observational challenge to have a reliable determination of their pulsation spectrum from ground-based observations. The typical pulsation periods of SPBs are of the order of a few days, and are therefore difficult to disentangle in ground-based data due to the 1 cycle/day aliasing. Moreover, a high frequency resolution is needed to resolve the theoretically predicted closely spaced periods. In this context the long and uninterrupted observations by CoRoT promise to shed new light on this class of pulsating stars.
We report here the analysis and interpretation of the light curves of three SPB candidates observed in the CoRoT sismo field: HD 181440, HD 182198 and HD 50230. We present a detailed frequency analysis and, thanks to the available detailed spectroscopic constraints (chemical abundances, effective temperature and surface gravity) we compare the observed and theoretically expected instability domain.

Poster presentations
P-VI-76

THEORETICAL GAMMA-DORADUS INSTABILITY STRIP AND FIRST COMPARISONS WITH COROT DATA

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The depth and thickness of the convective envelope plays a major role in the driving of gravity modes in gamma Dor stars (Guzik et al. 2000, Dupret et al. 2005).
However, convection in stellar modelling is described in a parametric way (mixing length theory MLT) and the depth of the convective envelope depends on the choice of the parameter alphaMLT. Moreover, the characteristics of stellar convective envelope depend on the physics adopted in stellar modelling, for instance: opacity tables (OP, OPAL), stellar chemical mixture (GN93, AGS05), transport processes such as overshooting, macroscopic and turbulent diffusion...
In this poster we present new computations of instability strips, using the Time-dependent Convection treatment of Grigahcene et al. (2005). We study their dependence on the physics used in the modelling, and present a preliminary comparison between theoretical instability strip and the gamma Doradus detected by CoRoT.

SESSION VII:
Planets: theoretical interpretation.

Oral communications
O-VII-36

THE COMPOSITIONS OF COROT'S GIANT PLANETS: IMPLICATIONS FOR PLANET FORMATION

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All of the «CoRoT planets» found so far in transit have particularities that make them key objects to understand planet formation: CoRoTExo-1 is the most metal-poor star to host a transiting planet. As such, it poses constraints for the formation of giant planets in a metal-poor environment. CoRoT-Exo-2b is the most anomalously large planet found so far: given its mass, it is so large that its radius cannot be accounted for by using the same recipes that would work for other anomalously large planets previously detected in transit. Solving for this large radius may impact what is inferred for some or all other transiting planets. With a mass of 22 times that of Jupiter, CoRoT-Exo-3b is the most massive substellar object found in transit so far. While it likely belongs to the class of objects formed like stars (i.e. brown dwarfs), it helps us to better constrain planetary evolution models and in particular opacity regimes in planetary interiors. Finally, CoRoT-Exo-4b and CoRoT-Exo-5b appear to be more «normal» planets, but their presence is important to populate the ensemble of well-characterized exoplanets, an ensemble which is becoming populated enough for statistical tests to detect groups and correlations. By putting the CoRoT planets into context, one can thus constrain how planets form.

Oral communications
O-VII-37

STRUCTURE AND EVOLUTION OF THE COROT EXOPLANETS. PROBING THE BROWN DWARF - PLANET OVERLAPING DOMAIN

J. Leconte, I. Baraffe, G. Chabrier, ENS-LYON, CRAL, Lyon, France

We present detailed structure and evolution models for the transiting extrasolar planets presently discovered by the CoRoT mission. The models include state-of-the-art equations of state for the H/He gas as well as for the various heavy elements characteristic of planetary interiors (water, silicates, iron) and irradiated atmosphere models consistent with the CoRoT star-planet sytems. Confronting these models with the observed radii enables us to derive useful information about the internal composition of the CoRoT objects and to identify the present theoretical uncertainties. This illustrates the powerful diagnostic of the mass-radius relationship to infer the internal structure of transiting exoplanets. Special attention is devoted to CoRoT-3b and to the identification of the very nature of this object, giant planet or brown dwarf, opening up the avenue to the observational identification of these distinct, overlaping populations of astrophysical bodies.

Oral communications

O-VII-38

THE MASS LOSS BOUNDARY FOR HOT GAS GIANTS: WHAT CAN WE LEARN FROM TRANSIT OBSERVATIONS?

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The critical orbital distance at which close-in transiting exoplanets maintain their initial mass is investigated by modelling the maximum expected thermal and non-thermal mass loss rates over evolutionary time scales. A modified energy-limited approach for thermal and a numerical test particle model for non-thermal atmospheric mass loss of the known transiting exoplanets at different semi-major axis and various assumed magnetopause stand-off distances are studied. For the estimation of non-thermal mass loss we include also collisions with stellar Coronal Mass Ejections which should significantly erode weakly magnetized short periodic gas giants. For the estimation of the thermal mass loss we include effects by the Roche lobe and the related X-ray and EUV flux of the host stars. Furthermore, we discuss the possible protection of atmospheres due to the formation time of the exosphere, which depend on the protoplanetary nebula conditions. A mass loss boundary for close-in gas giants related to the spectral type of the planets'host star is estimated and discussed in relation to the present known transiting exoplanets. Finally, the consequences of our findings for the planetary populations observed with CoRoT as well as predicted for CoRoTs first field will also be discussed.

Oral communications

O-VII-39

PLANET FORMATION BY NUCLEATED-INSTABILITY: PREDICTIONS FOR COROT

A. Yann (1, 2), F. Pont (3), I. Baraffe (4), W. Benz (2), D. Queloz (5), C. Mordasini (6, 2), G. Chabrier (4), S. Udry (5), C. Reylé (1)

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We have developed extended planet formation models based on the standard core-accretion model but taking into account migration of forming planets, as well as protoplanetary disk structure and evolution. These models were able to explain some of the properties of Jupiter and Saturn (mass, semi-major axis, mean metallicity, core mass, enrichment in volatile species), and, in a population synthesis approach, the observations of gas giant extrasolar planets around G stars. Here, we compare the outcome of the same models with already available CoRoT observations, and make predictions for the whole mission. For this, we proceed as follows. In a first step, we calculate formation models for stellar masses ranging from 0.1 to 2.0 solar masses, and a variety of metallicities. In a second step, we calculate planet radii using state-of-the-art planet evolution models, the planet composition being taken from formation models. In a third step, we use the Besancon model of the galaxy structure in order to derive the characteristics of CoRoT targets, in particular their V magnitude, mass, radius and metallicity. Combining these three results, we obtain the theoretical planet population in the CoRoT field of view. Finally, in the last step, we determine the suppopulation of these planets that can be observed by CoRoT and confirmed by radial velocity surveys. A first result is shown in the attached figure. In this mass versus semi-major axis diagram, the black dots are all the planets predicted by the formation model, the red dots are planets whose transit may be observed if they indeed transit, the blue dots are planets whose radial velocity effect can be measured for an orbital plan along the line of sight, and the green circles are planets that can be observed by CoRoT, taking into account all the effects (including geometry).

Oral communications
O-VII-40

PLANET FORMATION AND THE COROT PLANET CENSUS

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To predict and understand the properties of planets in the CoRoT discovery-space we developed a new general theory of planet formation. It provides information about the masses and radii of planets for all evolutionary stages. It goes beyond the usual categorisation of core-instability versus disk-instability models by providing a general framework that contains both approaches.
First we compute all hydrostatic gas spheres that can be thermally and mechanically embedded into gravitationally stable protoplanetary nebulae. From such ensembles of planetary equilibria we derive the initial mass functions of planets for host star masses of 0.4 to 2 solar masses and orbital periods from 1 to 64 days.
Planetary masses are found to be the result of self-gravity selecting particular equilibria. The initial mass functions are generally bimodal with peaks around Jupiter\'s and Neptune\'s mass. The peak values in the mass distributions depend most strongly on the host-star mass and somewhat on orbital distance. Generally near Neptune masses occur most frequently.
In a second step we solve the quasi-hydrostatic equations of stellar evolution to obtain the planetary radii for ages up to 15Ga for the entire ensemble of planets obtained in the first step.
Planetary evolution leads to an enhanced bimodality in the radius-distributions with a gap between peaks near the Jupiter and Neptune values.
Finally we compare the mass- and radii-distributions at the epoch of observation to the CoRoT-discoveries. We discuss dependencies of planetary properties on orbital distance and stellar host mass and the consequences for planet formation. Based on the results we outline a new physical approach to distinguish between sub-giant planets and super-terrestrial planets to calculate the upper limits for Super-Earths.

Oral communications
O-VII-41

STRUCTURE AND COMPOSITION OF SUPER-EARTHS

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Out of the 300 discovered exoplanets, ~10 of them are small enough to be rocky or icy planets. Up to date, none of these super-Earths are transiting but it is a matter of time before the first radius of a super-Earth is obtained. This will be a crucial step towards the characterization of these objects. CoRoT can play a decisive role by yielding the radius of super-Earths. I will discuss the framework I developed to infer the structure and composition of these planets provided mass and radius measurements. There is a strong degeneracy in composition that can fit the same data. Nevertheless, it will be possible to distinguish between the super-Earths that are necessarily icy from the ones that could be either rocky or icy. In addition, composition interpretation is more sensitive to the precision in radius, rather than in mass, so that any efforts in minimizing radius uncertainty have a large pay off.

Poster presentations
P-VII-77

CLOUD FORMATION IN THE ATMOSPHERES OF BROWN DWARFS AND GIANT PLANETS

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Dust cloud formation occurs in the atmospheres of very low mass stars and brown dwarfs at gas temperatures of less then 1800K for pressures between 1 and 10 bars, i.e. in the line forming region of these atmospheres. Recently, we have been modeling cloud formation via 2D multi-group Radiation Hydro-Dynamical (RHD) simulations of convection, leading to the discovery of gravity waves as the leading mixing mechanism responsible for cloud formation in these objects.
While conditions clearly favor cloud formation in brown dwarfs, irradiation from a close parent solar type star makes this situation unclear in the case of short-period gas giant exoplanets for which spectroscopic observations are available: chemical equilibrium calculations, for instance, indicate that favorable conditions are barely met in their photosphere. In this paper, we investigate the formation of clouds in short-period extrasolar giant planets using CO5BOLD accounting for impinging radiation from the star. Implications for the spectroscopic properties of exoplanets are explored using Phoenix.

Poster presentations
P-VII-78

TIME-DEPENDENT RADIATIVE MODEL FOR EXOPLANETS ATMOSPHERE

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We present a time-dependent radiative model for the atmosphere of extrasolar planets that takes into account a non-synchronous planet rotation or eccentricity of their orbit. We first investigate their thermal structure, chemical composition and spectral characteristics for phase-averaged incoming stellar heating. We then explore the temporal temperature and flux variation due to the variation of the planet-star distance and rotation. We will also anticipate observational aspects for some planet suitable for such measurements.

Poster presentations
P-VII-79

TIDAL INTERACTIONS OF COROT PLANETS

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The planets found so far by CoRoT are massive "hot jupiters" which exchange extreme tidal forces with their host stars. This leads to an angular momentum exchange resulting in a decrease of the planetary orbit and a spin-up of the stellar rotation. As a consequence this may result in the destruction of the planet. The tidal migration rate depends crucially on the ratio of the stellar tidal dissipation factor Q* and the stellar love number k2*, which we estimated very conservatively to be 5 x105 < Q*/k2*<1010.

Poster presentations

P-VII-80

MAXIMUM EMBEDDED EQUILIBRIUM MASSES FOR CLOSE-IN GIANT PLANETS

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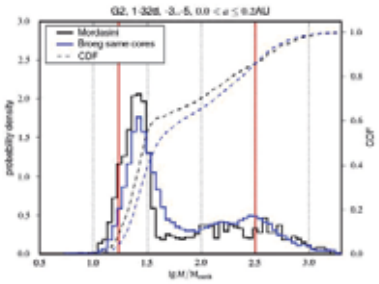
Current detections show quite a number of exoplanets with semi major axes below 0.1 AU or orbital Periods below 10 days. This poses a challenge for conventional planet synthesis methods (e.g. Ida & Lin 2004; Mordasini et al. 2008) because these depend on a prescribed disk structure. At such close proximity, however, little is known about the structure of disks. We have studied all possible gas giant planets in hydrostatic force balance (i.e. with sub-critical cores for the given conditions) in a range of feasible core accretion rates and core sizes. For hot planets it has been shown that the critical core mass can be very large and is therefore probably rarely exceeded (see Broeg & Wuchterl 2007). Therefore we expect close-in exoplanets to represent approximately a sub-sample of our hydrostatic solutions, with the best resemblance if all static structures are produced in nature and in roughly equal proportions. Major results of our study of equilibrium structures are the existence of a bimodal mass distribution having the low-mass peak in the Neptune mass range and the prediction of an upper mass limit that rises towards the star. This is a possible explanation for the lack of massive planets with orbital periods below 64 days. Furthermore, we have produced averaged mass distributions for the CoRoT fields. For close-in planets below 0.2 AU we have compared our solutions with results from monte carlo planet synthesis simulations (Mordasini et al. 2008). When imposing the core mass distribution derived from the planet synthesis simulations on our models, we get a good match of mass distributions (see figure).



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Poster presentations

P-VII-81

YOUNG PLANETARY SYSTEMS AND THE COROT SATELLITE

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Models of planetary formation suggest that gaseous giants are formed in timescales neatly shorter that rocky ones. A relatively straighforward test for this can be done by looking for planets around young stars of different ages. Rocky objects should only be found around the somewhat oldest stars. In this contribution, we make a selection of stars from young associations located in the CoRoT eyes in order to point out suitable stellar candidates for having already formed teluric planets.

Poster presentations

P-VII-82

CANDIDATE EXOPLANETS TO HARBOUR EXTREMOPHILE LIFE

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Extremophiles are microorganisms that dwell in extreme conditions of either high or low temperature, high or low pH, variable salt concentration, complete desiccation, toxic metals, toxic organic chemical compounds, and high levels of pressure or radiation. These conditions would kill most Earth adapted organisms. Extremophiles are thus excelent candidates to be found (to exist) in extraterrestrial conditions, even outside habitable zones (HZ), as in the moons of the solar system Titan, Europa and Enceladus. In this contribution, we estimate the temperature and (by analogy with planets in the solar system) other existing physical characteristics at the surface of exoplanets discovered by CoRoT and from the exoplanet Encyclopedia (http://exoplanet.eu/), and present a selection of extremophiles living on Earth that can live under those conditions.

SESSION VIII:
Detailed analysis of light curves

Oral communications
O-VIII-42

NOISE PROPERTIES OF THE COROT EXOPLANET DATA

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We present a detailed investigation of the noise properties of the CoRoT exoplanet field data, with a particular emphasis on the noise sources relevant for planetary transit detection. This contribution is the first of a logical sequence completed by the contributions proposed by F. Pont (on the CoRoT planet detection threshold) and F. Fressin (on the statistical interpretation of the CoRoT results), but each of these contributions will be placed in their wider context and thus could function in a standalone way.
Experience from ground-based transit surveys shows that their yield is fundamentally limited by correlated, or «red» noise in the light curves (see Pont, Zucker & Queloz 2006). From the ground, the Earth\'s atmosphere (in particular differential airmass and variable transparency) is thought to a major source of red noise, alongside instrumental effects (e.g. imperfectly corrected flat field, intrapixel variations, ...). As the first space-based transit search, CoRoT is not affected by the atmosphere, but its photometric performance is subject to new effects such as pointing jitter, temperature shocks and variations in the radiation background, in addition to the instrumental effects affecting ground- and space-based experiments alike. Quantifying both the magnitude and colou of the noise in the CoRoT light curves is a necessary step in any statistical interpretation of the CoRoT yield, and investigating its possible sources may help improve both its performance and that of its successors such as Kepler. We will present a detailed investigation of the noise properties of CoRoT based on the >1 year of data that is now available for scientific analysis. The preliminary analysis is being conducted on the data currently available, but where possible we will use the data produced with the new V2 pipeline in the final analysis.

Oral communications
O-VIII-43

EXOPLANETES CHANNEL POINT SPREAD FUNCTION ESTIMATION

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Context. The CoRoT mission has been searching for exoplanets since December 2006. Increasing the planets detectable level has been a key work for the CoRoT Ground Segment since then.
Aims. We present an algorithm to estimate a super-resolved point spread function (PSF) for each target of the CoRoT exoplanets channel. These PSFs are used in the CoRoT pipeline to estimate flux losses in the light curves due to the satellite jitter.
Methods. We state the stochastic model that describes the key-effect of the jitter into the on-orbit images and the super-resolution effect. We state the optimization problem derived from the inversion of the model. Finally, we solve it using an iterative method that takes into account the highly restrictive practical constraints imposed by CoRoT.
Results. Based on the CoRoT on-orbit data, we present the estimate PSF for the star orbited by the planet CoRoT-Exo-2b. Using the jitter photometric correction results, we demonstrate the quality of this PSF and the huge gain into the planets detectable
level.

Oral communications
O-VIII-44

NOISE IN THE COROT EXO-FIELD LIGHTCURVES

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Even if the mean spfication of the signal to noise ratio is reached in the CoRoT exo-filed lightcurves, a whole set of data reveals several particularities. The major one is that the lightcurve noise is generally not white, preventing the planet hunters from classical dction criteria at several sigmas. In this paper, we propose a careful analysis of noise sources as they have been identified, effects on the lightcurves and an analysis of treatments implemented in the pipeline to reduce their amplitude.

Oral communications
O-VIII-45
INVITED TALK: E. AGOL
TIMING OF TRANSITING PLANETS

Transits provide information about the density, mass, radius, surface gravity, atmospheric composition, albedo, recirculation, and orbital elements of the transiting planet. In addition, variations in the times of transit can yield information about the presence and properties of other bodies in the system. I will review the theory of transit timing for resonant, precessing, and trojan multi-planet systems. I will discuss the first applications of this technique to search for low-mass planets, which indicate that terrestrial planets in resonance could be detected if present, as predicted by some theories of giant planet migration. Finally I will look at the prospects for transit-timing for CoRoT, focusing on super-Earth multi-planet systems, which are very common in radial velocity surveys. In particular, transit-timing may be used to measure the mass in multi-planet systems when the star is too faint or the radial velocity signal too small to be easily measured; in addition, transit-timing may be used to constrain the inclination and mass of companion non-transiting planets.

Oral communications
O-VIII-46

CLEANING COROT LIGHTCURVES WITH POLYFIT AND SYSREM

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We present two-stage cleaning process to the CoRoT data. First, we fit the data with Polyfit, which considers each image separately, by deriving the residuals of all stellar magnitudes in an image relative to the stellar average over time. Polyfit then fits a polynomial to the stellar residuals as a function of their position on the chip and subtracts the fit from the stellar magnitudes. This stage removes systematic effects that depend on the stellar position. We then apply SysRem (Tamuz, Mazeh & Zucker 2005) to the resulting lightcurves, in order to clean systematics that do not depend on the stellar position on the chip. We present our results for LRc01, which show somewhat substantial improvement of the noise level.

Oral communications
O-VIII-47

THE SECONDARY ECLIPSE OF COROT-EXO-1B

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With a period of 1.5d, a large radius and an equilibrium Temperature of 1900K, CoRoT-Exo-1b is currently the best candidate for the detection of its secondary eclipse in the CoRoT data. We will present our attempts to detect such an eclipse with expected depths on the order of 0.0001 in units of normalized total flux. The analysis of the three color channels might allow to distinguish if any detected secondary is due to thermal emission
from the planet (as predicted by several models) or to reflected light from the star. Despite the shorter duration of the IRa01 run (where CoRoT-Exo-1b was discovered) with respect to LRc01, the low activity level of the host star makes the analysis less problematic than in the case of CoRoT-Exo-2b. ** If the V2 data for this star is available at the time of the Symposium, the significance of the results will be improved, and a search for the phase curve, which if detected provides important information about the efficiency of the heat transport from the day to the night-side of the planet, will be attempted. **

Oral communications
O-VIII-48

PLANET DETECTION THROUGH THE TIMING METHOD

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As recently demonstrated, the timing method is a powerful tool to detect planets around pulsating stars, in particular evolved compact pulsators such as sdB stars (Silvotti et al. 2007, Nature 449, 189) and white dwarfs (Mullally et al. 2008, ApJ 676, 573).In this talk/poster I will review the recent results obtained wth the timing method and concentrate on what could be done with CoRoT and Kepler, not only on compact pulsators like sdBs and white dwarfs, but also on other classes of pulsators, more numerous (e.g. Delta Scuti stars).

Poster presentations

P-VIII-83

SEARCH FOR THE SIGN OF A SECOND PLANET IN COROT-EXO-1B: TRANSIT TIMING VARIATION ANALYSIS

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It is well-known that planets perturb the orbit of each other which is reflected in the osculating orbital elements and through Kepler's third law in the period as well, hence the midtimes of consecutive transits deviates from a linear ephemeris. Depending on the configuration, this deviation can be in the order of tha parts of a second to days. Therefore TTV analysis is a powerful tool to study the presence or absence of further planets in a transiting exoplanetary system. The TTV analysis of the very recently discovered CoRoT-Exo-1b was carried out and the results are reported here.

Poster presentations

P-VIII-84

WHT OBSERVATIONS OF THE COROT-EXO-2B SECONDARY ECLIPSE

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The observation of secondary eclipses, when the planet disappears behind the star, indicates the brightness of a planet relative to the star. In IR wavebands, where albedo is negligible, this brightness can be used to infer the temperature of the planet; the combination of measurements from several wavelength bands may also discriminate between atmospheric models and indicate the abundance of constituents like H2O. Due to its large size and high equilibrium temperature, the planet CoRoT-Exo-2b is one of the best suited targets for the detection of secondary eclipses. Furthermore, the light curve and the spectral analysis have revealed that the host star is young, and thus the planet might present additional energy sources due to its on-going contraction. Under these considerations, the secondary eclipse should be detectable from a ground-based resource. We will present the results of two nights of observation with the LIRIS instrument at the 4.2m WHT telescope at La Palma. They were scheduled around two secondary eclipses in the H and K bands, and the observing conditions were very good. The data are currently under analysis, and the latest results (either a secondary eclipse detection or its upper limits) will be presented at the Symposium.

Poster presentations

P-VIII-85

SEARCHING FOR TRANSITING CIRCUMBINARY PLANETS IN COROT DATA USING CB-BLS

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Purpose: Already from the initial discoveries of extrasolar planets it was apparent that their population and environments are far more diverse than initially postulated. Discovering circumbinary (CB) planets will have many implications, and in this context it will again substantially diversify the environments that produce and sustain planets. We present first results an extensive search for transiting CB planets around eclipsing binaries.
Methods: We describe progress in search sensitivity, search generality and search speed of the CB-BLS algorithm, and some of the first searches for transiting CB planets using CB-BLS.
Results: We present some blind-tests with simulated planets injected to real CoRoT data, and some of the first results of applying CB-BLS to dozens of real light curves from both CoRoT and high-quality ground-based observations.
Conclusion: searching for CB planets is still somewhat of a learning experience, similarly to the state of transiting planets around single stars only a few years ago. The recent rapid progress in this front, coupled with the exquisite quality of space-based photometry, allows to realistically expect that if CB planets exist – then they will soon be found.

Poster presentations

P-VIII-86

TIMING VARIATIONS ON BINARIES WITH COROT

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Close eclipsing binaries (EB) that are in a longer-periodic orbit with a third body have been known for a long time to cause deviations from strict periodicity, observable as eclipse timing variations. This effect is due to the motion of the EB around the barycenter in common with the third body and know as LITE (Light Time Effect). CoRoT data give a unique opportunity to monitor eclipse times with high precision and high duty cycle over spans of several months. Here we describe the methods, capabilities and first results from a program to survey the binaries detected in the first pointings by CoRoT.

From our study of data provided by CoRoT, we present one example of the timing variations produced by the presence of a third body in the system and we explore the limitations of this method to detect bodies with planetary mass in the context of the CoRoT mission.

Poster presentations

P-VIII-87

IMPROVING COROT PLANETS PARAMETERS WITH TRANSIT RECONSTRUCTION IN THE PRESENCE OF STELLAR ACTIVITY

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An accurate characterisation of exoplanets is important to constrain planet formation and evolution models. This is difficult to achieve in the case of planets around active stars, as most of the current 'pre-detection' stellar variability filters, which are needed to allow the detection of the transits, alter the transit signal. We discuss how the transit signal is affected by the stellar variability filtering process in the case of the successful 'pre-detection' nonlinear iterative filter (NIF). We then present a new, 'post-detection' iterative reconstruction filter (IRF) which filters out the stellar variability while minimising the effect on the transit signal. Using simulated light curves from the CoRoT Blind Test 2, we show that the IRF leads to a significant improvement in the estimate of the planet parameters compared to the NIF. We apply the IRF to the planets discovered by CoRoT in an attempt to a) refine the planet parameters and b) search for secondary eclipses.

Poster presentations

P-VIII-88

SHORT FLUX RISES DURING TRANSIT EVENTS: STARSPOTS OR A SECOND TRANSITING PLANET?

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Short flux rises during transit events have been found in several cases. In this poster we present an analysis of a flux increase during the transit of the exoplanet system TrES-1. The conventional interpretation of this flux increase is a transiting planet occulting a starspot. Alternatively, we present a second hypothesis for the origin of this flux rise. It is based on the existence of an additional transiting planet with a longer period, with the flux rise occurring when one planet occults the other during transit. Both hypothesis show a similar feature in the light curve of a single transit. However, these hypothesis will differ by these properties: A starspot should show a flux rise with a wavelength dependency, whereas a flux rise from a mutual planet-planet occultation should not. Furthermore, a starspot is a temporary phenomena on time-scale of weeks to month; spots appear and disappear with different sizes at different positions. The planet-planet occultation would be a very rare event, except if the two planets are in a resonant orbit. In nearly all ground-based as well as in HST space-based observations, the coverage is limited to 6 hours. Therefore, the full transit of a putative second transiting planet in a wider orbit will most likely not be seen in these observations, e. g. a planet with a period of 300 days has a transit duration of approximately 10 hours - observable would be only the mutual occultation. However, CoRoT offers the unique possibility to observe a complete transit of a putative second transiting planet, to analyze the color information of the flux rise and to observe the evolution of a flux-rise feature in time, and hence confirm if flux rises in its detection are caused by a starspot or a second transiting planet.

Poster presentations
P-VIII-89

SEARCHING FOR THE MOONS OF EXOPLANETS

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As the number of known extrasolar planets continues to grow, the question as to whether such bodies harbour satellites has become one of increasing interest. A profound motivation is the search for rocky, habitable bodies which may support life. Observations and simulations suggest the Solar System could be a unique environment (1), and so perhaps life on an exomoon is more feasible than life on an exoplanet (2).
Direct detection of an exomoon is beyond the capabilities of current instruments, but the motion of a transiting exoplanet could offer a short-cut. In this work (3), we consider the wobble of an exoplanet due to an orbiting moon and conclude that a transiting planet will exhibit two measureable effects: i) mid-transit time variation (TTV) ii) transit duration variation (TDV). We evaluate the magnitude of these observables and demonstrate that CoROT could detect an Earth-like moon around a Neptune-like planet.

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SESSION IX:
Binaries, classification of variables

Oral communications

O-IX-49

AUTOMATED CLASSIFICATION OF LIGHT CURVES IN THE COROT EXOPLANET DATABASE.

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The CoRoT Exoplanet programme is producing a valuable database of several thousands of light curves, among which a large number of new variables. Automated methods are desired for an optimal exploitation of this large database, including, but not limited to, the identification of science objects on short timescales. We present the classification results obtained with the CoRoT Variability Classifier, for the first four measured CoRoT fields. This automated supervised classification method, developed in the framework of the CoRoT mission, assigns probabilities to every object to belong to any of a set of pre-defined stellar variability classes. Classification is done using attributes describing the light curve morphology. Statistics on the number of variables and the number of objects per class are given. We also present the first results of the application of clustering methods (i.e. unsupervised classification) to the CoRoT and OGLE datasets, the latter used here as a test bench for the interpretation of clusters. These unsupervised classification methods have the potential to discover new (sub)classes of variables, while the supervised methods are best suited to identify objects that belong to an already known variability class. The results of the work are offered to the CoRoT community for follow-up studies of the most interesting variables.

Oral communications
O-IX-50

COROT ADDITIONAL PROGRAMS ON BINARY STARS

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The exoplanet search provided, as by-product, thousands of new variable stars; among those the richest sample is that of eclipsing binaries (EBs). For the first time light curves of unprecedented precision and continuous coverage were made available for hundreds of EBs. Besides, EBs are present among asteroseismic targets, either because of intentional selection of known binary targets or as serendipitous discoveries; these binaries have light curves of the highest ever achieved photometric accuracy. The exploitation of such a wealth of data is challenging, because CoRoT photometric properties were obviously tailored on the requirements of core programs, not always optimal for other science cases, but itis nevertheless very promising in terms of scientific results. We present here a few highlights of the binary team results and briefly describe the tools and complementary observations realized for the purpose.

Oral communications
O-IX-51

PROPERTIES OF BINARY SYSTEMS FOUND IN THE COROT EXOPLANET SEARCH

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CoRoT's search for transits of extrasolar planets implies also thedetection of a large number of eclipsing binaries (EB). Here we describe the sample of eclipsing binaries that has been found as part of the planet detection effort. Most of the binaries found in the CoRoT data were identified during the planetary transit detection, since their light curves present clear features of stellar binarity, such as deep eclipses, primary and secondary eclipses with different depths, out-of eclipse brightness variations, or eclipse shapes indicative of stellar occultations. However, a smaller fraction of the eclipsing binaries has lightcurves very similar to transiting planets, and they were only identified during follow-up observations. Such cases include grazing EBs, EBsthat are in physical triple systems, and EBs that are spatially close to an unrelated star. Here, we present an overview over this sample of binaries. We will give the distributions of the binaries along the parameters period, amplitude, brightness. Also, statistical results on the fraction of binaries found in the different CoRoT pointings will be given, that may indicate correlations with the galactic position of the objects. Finally, we describe some special cases found in the sample, such as lightcurves resulting from the superposition of two pairs of eclipsing binaries. The results presented here may also be important for further transiting planet searches, especially space-based ones like Kepler orPlato.

Oral communications
O-IX-52

DISCOVERY OF LOW-AMPLITUDE PERIODIC VARIABLES WITH 0.1 MILLIMAG AMPLITUDE IN COROT LIGHTCURVES

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After applying Polyfit and SysRem to the LRc01 data, we searched the data for sine-wave periodic modulation. We discovered many variables, some of which with an amplitudes less than 0.1 milli-mag. We discuss the possible nature of these variabilities. Some could come from orbital motion of binary stars with ellipsoidal or reflection effects.

Oral communications
O-IX-53

POSSIBLE DETECTION OF MICROLENSING EFFECT AMONG COROT SELECTED ECLIPSING BINARIES

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In the framework of recent CoRoT observations of eclipsing binaries, we havedesigned an interactive fit software to study the recorded light curves of suchsystems, including traces of microlensing effects which are expected to occur during the transit of a compact (point-like or extended) object in front of the background star.Microlensing in a binary system is probably the only case for which the gravitationallens action may lead to well reproducible (periodic) effects.Following the results of simulations and fit techniques, we describe the interactivefit software written in IDL language with a Graphical User Interface and its possible utilization to integrate the PHOEBE suite for the study of eclipsing binary light curves. We apply this technique for the first time to selected CoRoT light curves of peculiar systems in order to obtain an estimate of the orbital and physical parameters of the two components. An interesting case possibly revealing microlensing effects has been identified forthe eclipsing binary system

Poster presentations

P-IX-090

AUTOMATED FREQUENCY ANALYSIS AND LIGHT CURVE MODELLING FOR COROT EXOFIELD DATA

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The CoRoT exoplanet programme has measured tens of thousands of stars, unavoidably containing many stars that are of potential asteroseismological interest. Even after filtering for e.g. the main-sequence pulsators alone, too many stars (hundreds) remain in the sample to analyse manually. For this purpose, a flexible and consistent pipeline has been carefully constructed to automate the Fourier analysis of hundreds of light curves obtained within the exoplanet programme. Post-processing tools to select the independent frequencies from candidate combination frequencies, and tools to search for period/frequency spacings have also been developed and included. In this poster, we present our pipeline and the statistical methodology it relies on. We provide examples of its capabilities and limitations. The resulting database of oscillation frequencies is extremely valuable to study variability properties of groups of stars in a statistical way or of individual stars that merit special attention and follow-up.

Poster presentations

P-IX-091

CHARACTERIZATION OF STELLAR VARIABILITY IN THE COROT FIELDS WITH BEST/BEST II

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The BEST project operates as photometric ground based support for the CoRoT space mission with two small aperture, wide-field-of view, telescope systems. They are located at Observatoire de Haute Provance, France and Observatorio Cerro Armazones, Chile, respectievely. Both are dedicated to the search for the stellar variability within the selected CoRoT stellar fields prior to the CoRoT observations. Here, we report on the results from the stellar variability analysis of the observational data obtained with BEST/BEST II since 2005. This scientific contribution includes the identification of several hundred new periodic variable stars in the CoRoT fields IRa01, LRc01, LRc02, LRa01 and LRa02. We also report on pre-discovery observations of CoRoT-Exo-1b and CoRoT-Exo-2b.

Poster presentations

P-IX-092

HD51106: AN ELLIPSOIDAL BINARY OBSERVED WITH COROT

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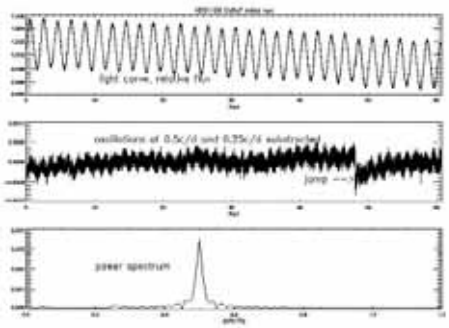
From the pre-CoRoT observations, we know some of the characteristics of the star: it is classified as A3, with an absolute magnitude estimated as 1.5. It is a binary system with an orbital period of 4.001 days. The mass ratio of the two components is 1.11. On the CoRoT light curve (see figure), one notice immediately a very regular oscillation, and a temporal drift probably due to instrumental effect. The Fourier transform shows essentially two frequencies, very close to 0.4995 cycle/day and 0.25 cycle/day. We made an analysis of the data, using pre-whitning method (via the Period04 code). Apart for those two frequencies, there are no other peaks in the power spectrum above the noise level, except for peaks which can be explained as harmonics or linear combinations of those two, or peaks due to the spectral window. So the light curve is convincingly characteristic of an « ellipsoïdal » binary, with a periodic signal at half the orbital period, plus a smaller signal at the orbital period. The main period of two days is due to the deformation of the stars in an ellipsoïdal shape, caused by tidal effect. The period visible at 4 days is linked to a slight asymmetry of the ellipsoids, produced for example by heating of the two hemispheres of the stars which are in front of each other. We can assume that the rotation of these stars is synchronized with the orbital period. After subtracting these two main frequencies from the light curve using prewhiting method, one can see a very conspicuous jump in the data at around 48 days (see figure). This is an instrumental or pre-reduction effect which could probably be eliminated.



Poster presentations

P-IX-093

NEW ANALYSIS OF THE EVOLVED, SEMI-DETACHED MASSIVE BINARY AU MON BASED ON COROT'S FIRST OBSERVATIONS

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We present the results of an observational study of AU Monocerotis (HD 50846). AU Mon is a semi-detached (Be+F) eclipsing binary with a known orbital period of 11.113037 days. The Be-component is accreting matter from an evolved F-type star which is reflected by the permanent presence of the Hα line-emission. Besides the eclipses, the binary system is also shown to exhibit ellipsoidal light variations as well as periodic brightness changes with a much longer period of about 417 days. We exploit the high-precision photometry taken during the initial run of the CoRoT mission, as well as new high-dispersion echelle spectroscopy obtained from two observatories. To these we added numerous archival photoelectric and radial velocity observations. Modelling of the light and radial-velocity curves by means of a procedure based on the Wilson-Devinney method and disentangling of the spectra of the binary components has led to the determination of new and accurate physical properties of this strongly interacting binary. We also derive an improved ephemeris as well as the period of the long-term brightness variation. We investigate whether we can assign the significant light changes occurring on a short time scale between the eclipses, as well as the cycle-to-cycle changes, to variations in the circumstellar matter within the system, or to stellar or disk oscillations.

Poster presentations

P-IX-094

THE COROT SECONDARY TARGET HD 174884: A SERENDIPITOUS EB-SB2

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HD 174884 (corot 7758) was selected as secondary target in the seismo-field of the first short run (SRC1). Being a B8V star it could, in principle, provide information on the red edge of the instability strip of the slowly pulsating B stars. The very precise light curve obtained by CoRoT revealed that the star is an eclipsing binary of quite unusual properties. The system has a short period (~3.6d), a high eccentricity, and an orbital orientation producing a tiny secondary grazing eclipse (of depth ~0.0015 mag), which could be detected only thanks to the high precision of the CoRoT light curve. We performed spectroscopic follow-up with the CORALIE spectrograph attached to the 1.2m Euler telescope at La Silla, Chile in June 2008. These data showed that the system is, as well, an SB2, allowing to derive the component fundamental parameters with high precision. These will constitute very important constraints for any seismic analysis of the system.

Poster presentations

P-IX-095

LOW-MASS BINARIES FROM COROT: STRINGENT TESTS FOR STELLAR MODELS

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Analysis of double lined eclipsing binary systems provide masses and radii of stars with enough accuracy to use these measures as constraints of stellar structure models. Tests over models have unveiled discrepancies between their predictions and observations for low-mass stars, however the number of well known low-mass eclipsing binaries is still scarce. It is expected that many of the transiting objects that CoRoT is providing will be low-mass eclipsing binaries, therefore we have been conducting a selection of eclipsing binaries. Preliminary estimates using the CoRoT light curves have already resulted in some good candidate systems. The combination of the precise photometry from CoRoT with radial velocity measurements will lead to thorough tests of models with a larger sample of low-mass stars than now.

Poster presentations

P-IX-096

FIRST COROT RESULTS ON NEW PULSATORS IN ECLIPSING BINARIES

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The CoRoT Variability Classifier tool identified a significant number of light curves where both pulsations and eclipses can be seen. Such new pulsators in eclipsing systems offer favourable circumstances for deriving additional, strong constraints on the fundamental parameters of the component stars, useful for a pulsational study. We here present the first results on 10 eclipsing binaries, likely with early-type components, observed by CoRoT. We derive their main characteristics and discuss the best methodology to apply in each case. Future interpretations will have to rely on new spectroscopy to be gathered for the most promising systems.

Poster presentations

P-IX-097

PULSATION SPECTRA OF PRIMARY COMPONENTS OF SELECTED ALGOL-TYPE VARIABLES IN COROT FIELDS

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We present results of analysis of CoRoT light curves of selected Algol-type eclipsing binary stars with pulsation components. The details of analysis and oscillation spectra of components are discussed. For the NRP mode identification, we present the analysis of observed (during primary eclipse) and modelled amplitude and phase changes of oscillation modes.

Poster presentations

P-IX-098

YOUNG LOW MASS ECLIPSING BINARIES IN NGC2264

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The three week long observation by CoRoT of the 3 Myr old star forming region NGC 2264 represents a totally unprecedented database of photometric monitoring of a young star cluster, in terms of both sampling and precision. We have analysed all 8150 light curves in the corresponding CoRoT run, finding over 100 eclipsing systems of which more than half fall on the CCD where most cluster members are located. We are in the process of obtaining follow-up observations to confirm cluster membership and measure component masses for a dozen of the most interesting systems. Once fully characterised, this sample will provide strong constraints on evolutionary models of low-mass stars over a wide mass range at a critical age where young stars are becoming de-coupled from their disks and contracting onto the zero-age main sequence.

In this contribution we will describe the method used to analyse the light curve and selected EB systems, and present a compilation of all available literature data on these systems. We will also present the results of preliminary light curve modelling of those systems for which spectroscopic follow-up is planned or underway.

SESSION X:
Seismology of giant stars

Oral communications

O-X-54

SOLAR-LIKE OSCILLATIONS IN RED GIANTS OBSERVED WITH COROT

J. De Ridder (1), T. Kallinger (2), C. Barban (3), S. Hekker (4, 1), F. Baudin (3), F. Carrier (1), A. Hatzes (5), W. Weiss (2), M. A. Dupret (3), A. Miglio (6), P. Eggenberger (6), A. Noels (6), M. J. Goupil (3), R. Samadi (3), J. Montalban (6)

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Just like the Sun, red giants are expected to oscillate, and are therefore potential targets for asteroseismic probing. What was uncertain, however, is whether these stars exhibit radial oscillations only, or also non-radial modes. In addition, it was unknown whether the modes in giant stars have a short or a long lifetime. Both aspects carry important information about the excitation and damping mechanisms of the oscillations, which relates directly to the physical processes inside these stars. We report here on the results of the CoRoT Red Giant Team which analyzed the high-quality photometric time series of red giants, both in the seismo field and in the exoplanet field. It turns out that CoRoT increases the number of red giants in which oscillations are detected with an order of magnitude. We show that red giant stars exhibit both radial and non-radial oscillations, and that at least for some giants the mode lifetimes are of the order of months. For several red giants, the frequency pattern we detect in the power spectrum clearly follows an asymptotic relation expected for high-order low-degree modes, as is observed for the Sun. For other red giants, the power spectrum seems to be more complex. We summarize here our observational as well as our theoretical conclusions

Oral communications
O-X-55

AMPLITUDES OF SOLAR-LIKE OSCILLATIONS IN RED GIANTS: COMPARISON WITH AN ADIABATIC SCALING LAW

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Solar-like oscillations have been detected by CoRoT in numerous red giants stars. The seismic analysis of the CoRoT data from the exo-channel provides estimates of the amplitudes of these oscillations. The amplitudes of the solar-like oscillations detected so far in spectrometry in the main sequences stars clearly scale as (L/M)0.7 where L and M are respectively the luminosity and the mass of the star. The question we address here is whether or not such scaling remains valid for the red giants.

Oral communications
O-X-56

THEORETICAL AMPLITUDES AND LIFE-TIMES OF NON-RADIAL SOLAR-LIKEOSCILLATIONS IN RED GIANTS

M. A. Dupret

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Radial and non-radial solar-like oscillations have been detected in many red giants observed by CoRoT. We present the theoretical lifetimes of radial and non-radial modes of several red giant models, obtained using a full non-adiabatic pulsation code including a time-dependent treatment of convection. Next, using stochastic excitation models, we compute the amplitudes and heights of these modes. Very distinct cases are predicted depending on the evolutionary status. In the first case, radial and non-radial modes have heights in the power spectrum of the same order of magnitude, leading to a dense forest of modes difficult to interpret. In the second case, the frequency spectrum shows a pattern comparable to classical main sequence solar-like oscillations and asteroseismology becomes possible. In the third case, only radial modes should be observed. Explanation of these results in term of mode trapping and radiative damping is given. Finally, these different possible scenarios are confronted to the results obtained from the light curve analysis of CoRoT targets.

Oral communications
O-X-57

INFERENCE FROM ADIABATIC ANALYSIS OF SOLAR-LIKE OSCILLATIONS IN RED GIANTS

A. Miglio, et al.

Université de Liège, Liège, Belgium

The clear detection with CoRoT of radial and non-radial solar-like oscillations in many red giants paves the way to seismic inferences on the structure of such stars. We present an overview of the properties of the adiabatic frequencies and frequency separations of radial and non-radial oscillation modes, highlighting how their detection allows a deeper insight into the properties of the internal structure of red giants. In our study we consider models of red giants in different evolutionary stages, as well as of different masses and chemical composition; the effects of other physical processes and uncertainties (such as rotation, treatment of convection) are also addressed. We describe how the large and small separations computed with radial modes, and with non-radial modes mostly trapped in the envelope, are related to the properties of the acoustic cavity and we investigate the diagnostic potential of the observed modes.

Oral communications

O-X-58

EXOFIELD RED GIANTS: FUNDAMENTAL PARAMETERS AND FIRST RESULTS FROM ASTEROSEISMIC MODELING

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CoRoT has observed hundreds of stars in its exofield, which show a signal that is typical for stochastically oscillating red giants. They are characterized by increasing excess in power towards longer time scales due to the turbulent flux in their convective envelopes and a broad power excess hump due to pulsation in their power density spectrum. The latter appears to occur in many cases as regularly spaced mode profiles as it is expected from the asymptotic relation for low-degree and high-radial order p-modes, where the mode lifetimes are on the order of weeks. Hekker et al. (this conference) have been shown that one could use the power spectra to identify oscillating red giants among the plenty of data sets. Not much is know about the stars observed in the CoRoT exofield. Luckily there is a method that allows determining the fundamental parameters of any solar-type pulsator from the time series observations alone. This is done by making use of the frequency of maximum pulsation power, the asymptotic large frequency separation, and the total spectral power due to pulsation. This 3 quantities can be directly extracted from the power density spectra and scale either with the mean stellar density or the sound speed and the pressure scale height in the outer layers and are hence a measure for the stellar mass, radius, and effective temperature. They can therefore be used to uniquely place a star in the HR-diagram.We will demonstrate the methodology and the underlying, newly calibrated, scaling law for the total spectral power due to pulsation.
Additionally we will present the convective time scales and amplitudes for our sample of red giants as well as first results from a comparison of the extracted mode frequencies with theoretical eigenspectra of strongly trapped p-modes, determined from large grids of red giant models.

Poster presentations
P-X-099

HD50170: A SEISMIC BINARY

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This star, a luminous giant, has been observed for 61 days and has proven to be a special case: its Fourier spectrum presents the signature of asymptotic p modes AND self-excited modes at low frequency. The interpretation of these two features leads to an incompatibility: no model can apparently explain simultaneously both features. Thus, the possibility of dealing with a binary star has been considered. This may be confirmed by spectroscopic observations done with the spectrograph IMACS on the Magellan telescope. This can bring interesting possibilities in terms of interpretation because of a common age for both stars as an additional constraint, and the possible mass determination from spectroscopic observations.

Poster presentations
P-X-100

IDENTIFYING RED GIANTS IN THE COROT EXOFIELD DATA

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Red giants presumably have solar-like oscillations and are therefore interesting for asteroseismology. Because all stars with low or intermediate masses go through a red giant phase, they are common and expected to be present among the stars observed in the CoRoT exofields. Due to the fact that the stars observed with the exoplanet eye are relatively faint (10-16 mag in V), it is not a priori known which of the observed stars are red giants.
To identify red giants in the exofield observations we used their power spectra. Solar-like oscillations in red giant stars appear at frequencies of a few to about hundred μHz and appear as a broad excess in power, typical for stochastic oscillations. These features together with increasing excess in power at low frequencies due to granulation are used to identify about 400 red giant stars in the first long run exofield data.
The identification of these red giants increases the number of red giants with observed solar-like oscillations by a factor of 40. Which provides the possibility to gain better observational understanding of these stars.
A first remarkable point to make about these CoRoT observations is the difference in the power spectra of the identified red giants. Some stars show power spectra with a regular pattern that can be interpreted with the asymptotic relation for high-radial order and low degree p-modes, while some stars show a «forest» of peaks (complex pattern), or a combination of both, i.e., a «semi-complex» pattern. To further investigate this, the stars are classified in the three mentioned categories by the regularity in their respective echelle-diagrams.
The methodology of the selection and classification will be presented.

Poster presentations
P-X-101

EXOFIELD OSCILLATING RED RIANTS: FUNDAMENTAL PARAMETERS AND FIRST RESULTS FROM ASTEROSEISMOLOGY

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Poster presentations
P-X-102

SOLAR-LIKE OSCILLATIONS IN RED GIANTS AS OBSERVED BY COROT: THE CASE OF HD 50890

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The detection of solar-like oscillations in red giant stars has open a new era in asteroseismology with the possibility of probing the interior of stars in the future evolutionary status of our Sun. The high quality and continuity of the CoRoT photometric data will allow us to make a step further in the understanding of these stars. Hd 50890 has been observed during the initial run and 54 days of data have been obtained in the CoRoT seismology field. We present here the data analysis performed for this star.

Poster presentations
P-X-103

MODELLING OF PULSATIONS OF GIANT STARS

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Astronomical Institute of the Romanian Academy, Bucharest, Romania

We present some recent results concerning the modelling of the pulsations of giant stars. We review methods of extracting information on stellar interior structure from pulsation data by means of asteroseismology. We calibrated these methods for selected stars observed by the MOST space mission. Our results are in good agreement with these obtained by the MOST team. Also, we intend to use these methods to the CoRoT data, as soon as these will be available.

Poster presentations
P-X-104

SEISMIC MODELLING OF THE RED-GIANT COROT TARGET HD181907

A. Miglio (1), et al.

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HD181907 is a bright (V=5.8) red giant observed by CoRoT in the sismo field of the first long run. The outstanding CoRoT lightcurve allowed the detection of several solar-like oscillation modes (both radial and non-radial, see Carrier et al). On top of these seismic constraints, our observational knowledge on HD181907 benefits as well from a precise parallax and detailed spectroscopic constraints. We present the modelling of this most promising target taking into account all available observational constraints.

Poster presentations

P-X-105

PROGRESS IN THE FRONT OF EXTREME HORIZONTAL BRANCH STARS ASTEROSEISMOLOGY

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We present advances in the front of extreme horizontal branch stars (also known as "subdwarf B" or sdB stars) asteroseismology. The sdB stars are fairly hot and compact objects that correspond to an advanced stage of stellar evolution, after the main sequence and the first red giant branch. The sdB stars host two groups of non-radial, multi-periodic pulsators : rapid oscillations (a few minutes) are identified with low-degree, low-order p-modes; while long-period (0.75 – 3 h) sdB pulsators exhibit low-degree, mid-order g-modes.
A significant fraction of sdB stars reside in close binaries, with orbital periods from hours to days. We have recently demonstrated that two sdB pulsators, primaries of two close binary systems, rotate as solid bodies with periods equal to their orbital periods in the most part of the star (from the surface down to at least ~0.5 and ~0.3 of their radius respectively). They have therefore reached deep spin-orbit synchronism within the relatively short lifetime of sdB stars (~108 yr). On the other hand, single sdB stars provide the opportunity to study angular momentum evolution since the main sequence and the first red giant branch.

Subdwarf B stars have convective helium-burning cores, whose some properties (size, extension of the overshooting region) can be determined from asteroseismology. Some progresses in that direction are presented, thanks to the recent development of our new third-generation complete sdB models.

Asteroseismology of sdB stars is therefore extremely fruitful to study several important aspects of stellar physics, as internal dynamics, angular momentum transport and convection properties. These also constitute the guidelines of the CoRoT mission, which will indeed observe the long-period pulsator KPD 0629-0016 in last 2009.

Poster presentations

P-X-106

EFFECTS OF ROTATION ON THE ASTEROSEISMIC MODELLING OF RED GIANTS

P. Eggenberger, A. Miglio, J. Montalban, O. Moreira, A. Noels

Université de Liège, Liège, Belgium

The observation with CoRoT of solar-like oscillations in many red giant stars stimulated the theoretical study of the effects of various physical processes on the asteroseismic modelling of these stars. In this poster, the effects of rotation on the modelling of red giant stars are presented. The structural effects of rotation as well as the effects of rotational mixing on the asteroseismic properties of red giants are discussed by comparing rotating models computed with a comprehensive treatment of shellular rotation to non-rotating ones. While red giants exhibit low surface rotational velocities, we find that the rotational history of the star has a large impact on its properties during the red giant phase.

Poster presentations

P-X-107

EXCITATION OF G-MODES IN HE BURNING BLUE SUPERGIANTS

M. Godart (1), A. Noels (1), M.-A. Dupret (2), J. Montalban (1), P. Ventura (3), G. D'Antona (3)

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The excitation of g-modes in post-main sequence massive stars depends on the presence of an intermediate convective zone (ICZ) around the radiative core. This ICZ avoids the propagation of g-modes into the core and therefore the strong radiative damping. Such stars can be either on the H-shell burning phase or already in the core He-burning phase. We computed He burning models in order to investigate whether the ICZ is still present. We also determine the stability of non-radial modes.

Poster presentations

P-X-108

FIRST RR LYRAE LIGHT CURVES FROM COROT: MULTIPERIODICITY AND BLAZHKO PHENOMENON

M. Chadid (1), K. Kolenberg (2), M. Paparo (3), E. Poretti (4), J. Benko (3), E. Chapellier (1), E. Guggenberg (2), J.-F. Le Borgne (5), F. Rostagni (1), R. Szabo (3), H. Trinquet (1)

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RR Lyrae stars play a major role in astrophysics as standard candles for distance determination and as witnesses of the evolution of the universe at young age. These variable stars occupy a very specific status in the pulsating variable stars family. With their large amplitudes they have been known for more than a century. Although these stars are well studied, the major questions concerning RR Lyrae stars remain to be solved, like the origin of the so-called Blazhko effect (Blazhko 1907, Astr. Nachr. 175, 325), a periodic modulation in both the amplitude and the phase of the main pulsation on timescales of typically tens to hundreds of days. A century after its discovery, the phenomenon remains a mystery and we still lack a plain explanation of the physical mechanisms driving the Blazhko effect, since ground based data are affected by single-site aliasing. To cope with this challenge we took advantage of the quasi-uninterrupted coverage over several Blazhko cycles and the unprecedented photometric accuracy of CoRoT observations in the first Long Run Center of the Milky Way. Here, we discuss the first frequency analysis results of the five RR Lyrae stars in CoRoT field LRC1, we present spectroscopic and photometric ground-based dataset and we give new insight for future Blazhko theoretical investigations.

SESSION XI:
Françoise Praderie: from research to science policy

Oral communications
O-XI-59
INVITED TALK: C. CATALA (PARIS, FRANCE)
OPENING NEW WAYS IN STELLAR PHYSICS

Oral communications
O-XI-60
INVITED TALK: D. ALLOIN (PARIS, FRANCE)
BUILDING THE NATIONAL AND EUROPEAN SCIENCE POLICIES

SESSION XII: Rotation, convection, activity

Oral communications

O-XII-61

INVITED TALK: M. GIAMPAPA NATIONAL SOLAR OBSERVATORY, TUCSON, USA

COROT: A TOOL FOR STELLAR DYNAMO DIAGNOSTICS

In this invited talk I will explore the prospects for the application of diagnostics of solar dynamo properties to stellar observations, especially through the use of high precision photometry and high resolution spectroscopy. In addition, I will review some developing trends in our views of the relationship between rotation, convection and magnetic activity.

Oral communications
O-XII-62

THE ENIGMATIC GRANULATION BACKGROUND OF HD49933

H. G. Ludwig, R. Samadi

Observatoire de Paris-Meudon, Meudon, France

HD49933 is a metal-depleted ((Fe/H)~-0.4) F-dwarfs, and was one of the first main seismic targets of CoRoT for which a high quality light-curve was acquired. We performed dedicated 3D hydrodynamical simulations of convective surface flows with the goal to reproduce the high-frequency brightness fluctuations which are observed in the light-curve's power spectrum. These fluctuations are attributed to the presence of granulation. While the convection simulations provide a reasonably accurate match to the granulation background in the Sun, HD49933 displays striking discrepancies. Comparison with the spectra of the similar CoRoT targets HD181420 and HD181906 reveals that HD49933 is not a singular case among them. A possible reason for the failure of the models is the neglect of magnetic fields. However, if this is indeed the reason we have to conclude from the homogeneity of the observed stellar spectra that small-scale surface magnetic fields are ubiquitous among F-dwarfs, lending strong support to the notion of local dynamo action in these stars.

Oral communications
O-XII-63

ROTATION VERSUS ACTIVITY IN COROT ERA

J. do Nascimento, C. Cortés, L. P. de Souza Neto, S. S. V. Barros, S. Alves, J. De Medeiros, T. AcRoCoRoT

Universidade Federal Do Rio Grande Do Norte, Natal, Brazil

We present the first results of the activity versus rotation relationship for a bonafide sample of stars observed by CoRoT. In this analysis, we used Cleanest and Wavelet techniques. The Wavelet algorithm developed by Natal team is capable to extract from CoRoT high precision light curves accurate information of the rotation periods based on the spots dynamic and evolution. For all the stars of the present sample, we have spectroscopic observations of the CaII H&K region. This preliminary analysis shows the parallel evolution of activity and rotation along the evolutionary logg logTeff diagram for a sample of some 100 CoRoT stars. The present analysis brings a new light on our understanding of the role of rotation on chromospheric emission.

Oral communications
O-XII-64

A COROT OBSERVATION OF THE STAR-FORMING REGIO NGC2264

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1 European Space Agency, Paris, France, 2 INAF OSS. Palermo, Italy; 3 Exeter University, Exeter, UK; 4 UFMG, Belo Horizonte, Brazil; 5 University Of Vienna, Vienna, Austria

We have performed a CoRoT short observation of the star-forming region NGC 2264. High accuracy photometry of young stars offers, in addition to CoRoT «main» topics of planetary transits and asteroseismology, unique opportunities to study a number of physical processes, including stellar rotation, accretion processes, and stellar activity. NGC 2264 is the only star-forming region observable with CoRoT, and it luckily has some characteristics which make it very well suited to photometric observation, including the presence of a thick layer of absorbing material behind it. We are currently analyzing the observation, and have structured the work in four teams, namely stellar rotation and activity (under the responsibility of G. Micela), accretion processes (S. Paixao Alencar), eclipses (S. Aigrain) and asteroseismology (K. Zwintz). I will present an overview of the results achieved so far and of the ongoing work, with highlights from each of the four key topics. Each topic will be covered in more extensive detail in separate presentation by each of the team leaders.

Oral communications

O-XII-65

ACCRETION DYNAMICS AND STAR-DISK INTERACTION IN NCG2264

S. Alencar (1), J. Bouvier (2), C. Catala (3), M. Deleuil (4), M. Fernandez (5), N. Fonseca (1), F. Gameiro (6), J. Gregorio-Hetem (7), M. Guimaraes (1), E. Moraux (2)

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CoRoT observed the young stellar cluster NCG2264 during 22 days in March 2008. This is the first time a group a young accreting stars, classical T Tauri stars (CTTS), are followed uninterruptely with high photometric precision for such a long run. Before the CoRoT observations, only a few CTTS systems had been analysed synoptically and the observational results already suggested a highly dynamical star-disk interaction, as predicted by MHD simulations of young accreting systems.NCG2264 is a very well studied young stellar cluster and we were therefore able to obtain a good estimate of cluster members. Among cluster members, we could separate accreting from non-accreting systems, using indicators such as Halpha equivalent width, Halpha width at 10% and UV excess. We are now tentatively identifying young stars with circumstellar disks viewed at high inclinations, so that most of the light curve variations is due to obscuration by circumstellar matter from the inner disk region. We will then be able to study the distribution (and the dynamics) of matter at the inner disk region, that is supposed to depend on the star-disk interaction. We are also analysing simultaneous high-resolution spectroscopy obtained with the SOPHIE spectrograph at OHP and groundbased UBVI photometry and polarimetry of two CTTSs in NGC2264, V354 Mon and LU Mon. A detailed study of these systems will allow us to constrain various aspects of the accretion process dynamics and relate spectroscopic features, such as veiling and emission line morphology and intensity, to the photometric ones. This will allow us to test predictions of magnetospheric accretion models and MHD simulations of young accreting systems.

Oral communications

O-XII-66

ANALYSIS OF ROTATION OF COROT DWARF STARS

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Analysis of Rotation of CoRoT Dwarf Stars Rotation is one of the fundamental parameters governing stellar evolution, affecting for example interior mixing processes, and thus stellar lifetimes (and inferred ages), surface chemical composition and evolution. Therefore understanding angular momentum evolution is key to understanding the details of stellar evolution. Stellar rotation periods are best measured, in spotted rotators, through the photometric modulation induced by the surface non-homogeneity. Our work is focused on the study of the distribution and evolution of rotational periods in field solar-type stars, using the light curves (LCs) produced by CoRoT. We analyzed all dwarf stars selected from the exoplanet field available to date in the CoRoT database. The large number of light curves analyzed enables the study of the distribution and evolution of rotational periods of an unbiased sample, enabling a statistical analysis. We met a number of problems in the analysis of the complete sample of ~10,000 LCs arising from instrumental effects. We corrected some of these effects and eliminated from the sample LCs with jumps due to hot pixels, reducing the sample to ~7800 LCs. We derived the rotational periods, and the relative distributions, for the resulting sample of both the initial and first long run light curves. We present the resulting rotational period distribution for each spectral type and discuss the apparent presence of a significant number of fast rotators.

Oral communications

O-XII-67

PHOTOSPHERIC ACTIVITY AND SURFACE DIFFERENTIAL ROTATION IN THE PLANET HOSTING STARS COROT-EXO2A & 4A

A. F. Lanza (1), I. Pagano (1), G. Leto (1), S. Messina (1), A. S. Bonomo (2), S. Aigrain (3), M. Auvergne (4), A. Baglin (4), P. Barge (5), A. Collier Cameron (6), M. Deleuil (5), J. R. De Medeiros (7), B. Foing (8), C. Moutou (5)

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We present an analysis of the out-of-transit white band light curves of two stars discovered by CoRoT to host transiting hot Jupiters, one of which (CoRoT-Exo-2a) is a good proxy for the Sun at an age of approximately 0.5 Gyr. We have applied spot modelling tools based on Maximum Entropy regularization, previously tested with an analysis of the observations of the Sun as a star obtained by the VIRGO experiment on board of the SoHO satellite. For CoRoT-Exo-2a (spectral type G7V), we have found two active longitudes that persist for the whole duration of the observations (142 days), whose relative longitudinal migration provides a lower limit of about 0.7 percent for the amplitude of the surface differential rotation. We also find evidence for a longitudinal migration of individual spots within each active longitude. The variation of the total spotted area versus time reveals a short-term spot cycle, possibly analogous to the Rieger cycles observed in the Sun, with a period of about 28.9 $$ 4.3 days. For CoRoT-Exo-4a (spectral type F8V), we have found that stellar rotation is synchronized, on the average, with the orbital motion of the planet, improving a previous determination based on autocorrelation analysis. However, a surface differential rotation with a relative amplitude of about 9 percent has been derived from the relative migration of three active longitudes observed during an interval of 57 days. We discuss the above results for both stars considering also possible magnetic starplanet interactions.Partially based on: Lanza et al. (2008), A&A, accepted (arXiv:0811.0461)

Oral communications

O-XII-68

COROT-EXO-2 STARSPOTS PHYSICAL CHARACTERISTICS

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Starspots on the surface of a star can be detected through the transit of an orbiting planet, as small variations in the light curve of the star are observed when the planet passes in front of a spot. The CoRoT satellite has observed with a 32-s sampling a total of 77 consecutive transits of the planet CoRoT-Exo-2b, corresponding to an interrupted period of 134 days. All the transits exhibit many small light variations at 4 sigma from the noise level, that we analyzed using a spot model. A fit to the light curve allows to estimate the size, intensity (or temperature), and position (latitude and longitude) of the star spots. We find that during a transit, an average number of six spots are necessary to fit the data, from a total of 18 spots with fixed longitude. By assuming a stellar rotation period of 4.54 days, it is possible to follow the same spot on successive transits and thus infer the temporal evolution of its physical parameters. The orbital parameters used are the ones listed in the literature, except for the planet radius that had to be increased to 0.172 Rstar because when the spot contribution to the light curve is removed, the transit is actually deeper. The model includes the effect of foreshortening and considers that all the spots are located along the transit line, which corresponds to a fixed latitude of 14.6o. Two types of analyses have been performed, the first one kept the size of the spots fixed at 0.5 the planet radius (Rp), which corresponds to a surface area coverage of about 18% (considering only the occulted area), and the intensity determined from the fits varied from 0.2 to 0.8 of the disk central intensity (Ic), which can be converted to temperature by assuming blackbody emission for both the photosphere and the spots. The second type of analysis was made keeping the intensity of the spot constant and allowing the spot radius to vary. For a spot constant intensity of 0.665 Ic, the average size of the spots, or spot groups, was (0.53 + 0.17) Rp. Simulations varying the fixed spot intensity between 0.3 and 0.8 Ic yield mean area coverages between 10% and 39%, increasing with spot intensity. In both types of analyses, preferred longitudes for the spot occurrence were observed. In time, the spots on CoRoT-Exo-2 were seen to rise and decay in intensity, similar to sunspots.

Posters presentations

P-XII-109

STELLAR ACTIVITY AND SPECTRAL CLASSIFICATION: A QUANTITATIVE ANALYSIS FROM THE COROT LIGHT CURVES

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A Sun-like magnetic activity is expected to be observed in stars with a deep enough convective envelope and a fast enough differential rotation. A signature of this magnetic activity is observed in long photometric observations. Such observations have confirmed that the late-type main sequence stars are more likely to be magnetically active. By providing a large number of light curves with high precision and high stability, CoRoT yields a deeper knowledge of the stellar micro-variability and of its determinants.

Our work is focused on a systematic and quantitative analysis of an activity photometric signature within a large sample of stars distributed all along the HR diagram. The light curves of seismological and exoplanet targets are preliminarily cleaned of instrumental effects. The Fourier power spectrum is analyzed in order to identify a rotational modulation and an activity-characteristic low-frequency contribution. The large number of available light curves allows the determination of an observed level of activity against the color temperature: an activity index is computed based on the low-frequency power density and its correlation with the color temperature is determined. A Rossby number is estimated for the stars whose light curves show a rotational modulation from which a rotation period is derived. The correlation between an activity index and the Rossby number allows the observationnal test of the predicted relation between magnetic activity and the Rossby number.

While a lot of active stars have been already identified thanks to various instrumental techniques, a more systematic analysis of a large sample of stars, all of them being observed with the same instrument, is expected to contribute to our knowledge of the determinants of stellar activity.

Posters presentations

P-XII-110

STELLAR PARAMETERS OF SOLAR-TYPE STARS OBSERVED IN THE COROT MISSION

B. Leonardo Canto Martins, C. Cortés, L. Pinheiro de Souza Neto, S. Carneiro Maciel, S. Vieria, J. Renan de Medeiros, Natal CoRoT Team

Departamento de Física/Universidade Federal do Rio Grande do Norte, Natal, Brazil

An essential step for the understanding of the stellar evolution is the physical characterization of stars. In this sense, the computation of reliable photometric period for CoRoT targets without the help of their physical parameters became a hard work. In this context, in order to obtain periods reflecting the rotational modulation of stars in the CoRoT`s fields, we have carried-out several spectrocopic observational runs in the fields already observed by the satellite. In this work we present the fundamental physical parameters (Teff, log (g), (Fe/H)) for a large sample of CoRoT`s targets, obtained from a detailed spectral synthesis analysis. In addition, we have also derived the rotational velocity of stars in the sample, as well the chemical abundances of light elements, as Li. The spectra were observed using the spectrograph HYDRA-CTIO and UVES-VLT. The stars are located along of different evolutionary stages as shown in Fig. 1.

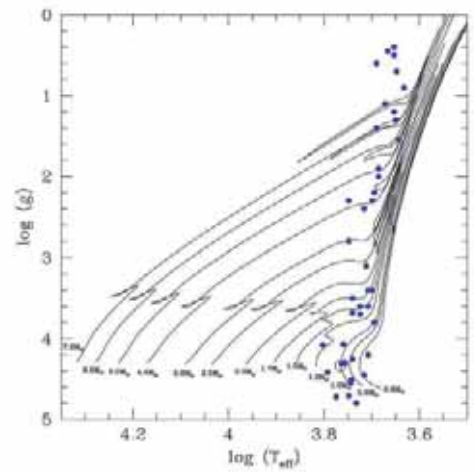

Fig. 1. A sub-sample of our target list in the HR diagram. Black-solid curves represent evolutionary tracks with Z=0.019 (Girardi et al. 2000), with masses between 0.8 and 7.0 solar masses.

Posters presentations
P-XII-111

ROTATION, CONVECTION AND ACTIVITY ON GIANT STARS: COROT PRELIMINARY RESULTS

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1 ESA/ESTEC, Noordwijk, The Netherlands; 2 Imperial College, London, UK; 3 IAS , Orsay , France; 4 Observatoire de Paris , Meudon , France ; 5 OCA Observatoire de la Cote d'Azur , Nice , France ; 6 SRON , Utrecht , Netherlands ; 7 IAC, La Laguna, Spain

We have analysed rotation modulated light-curves of active giants observed with CoRot using spots models. Preliminary results suggest an increase of the surface spot coverage with decreasing rotation period. A maximum of the surface spot coverage seems to occur on giants with effective temperature around 5100 K. Confirmation and interpretation of these preliminary results require measurements of independent activity indicators, identifications of binary systems, and a determinations of the stellar parameters and evolutionary status of the sample stars. This work is currently being performed using ground-based follow-up observations.

Posters presentations
P-XII-112

ON THE DIFFERENTIAL ROTATION OF EXO-2A

H.-E. Fröhlich

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The hypothesis of a few long-living star-spots on the differentially rotating surface of that young star is explored. This is unlike the sun and a view alternative to that of Lanza et al. (2008). Bayesian spot modeling technique is applied to the 142 days long light curve. Mild spot evolution is modeled by low-order Legendre polynomial expansion of the logarithm of spot area in time. With the Markov-Chain Monte-Carlo method at least five rotational frequencies are identified. From the extreme values alone a minimal value for the differential rotation parameter results: k greater than 9 per cent, i.e. 0.12 rad/day. This work is in the framework of the approved additional program on «Stellar variability and microvariability. II. Spot maps and modelling»

Posters presentations
P-XII-113

ROTATION AND ACTIVITY OF NGC 2264 MEMBERS

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The three uninterrupted weeks of the CoRot observation on NGC 2264 offer a unique opportunity to study in a homogeneous way rotation and activity of a complete sample of pre-main sequence stars. We have determined the rotational periods of the observed cluster members, testing the significance of the results with extensive simulations and comparing the derived periods with those available in literature when possible. We present our first results discussing the rotational properties as a function of stellar parameters (mass, class, X-ray luminosity...). We are also analysing 60 ksec Chandra X-ray observation, simultaneous with the CoRot one, that we obtained as part of the Chandra DDT time. We find that while a fraction of the observed optical flares are observed also in X-rays, a significant part of them are uncorrelated with X-ray events.

Posters presentations
P-XII-114

DETERMINATION OF STELLAR ROTATION PERIOD FROM COROT DATA

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UFRN, Natal, Brazil

We describe our procedure to search for rotational modulation in CoRoT data, based on two major methods: CLEANest and Wavelet. Based on the CoRoT-Natal Light Curve Simulator and other applications, such as Sunspot data, we show that these techniques are a solid procedure to extract the stellar rotation period and possible variations due to active regions evolution. We can also identify the noise level, as well as the contribution for the light curves produced by intensity, variability and mean lifetime of spots. Thus, we can identify clearly the temporal evolution of the rotation period in relation to other periodicity phenomena affecting stellar light curves. We also obtained periods with the stellar physical parameters from spectroscopy, which might solidly be interpreted as the rotation period. Because these techniques are powerful tools to solve, in particular, non trivial cases of light curves, we are confident that such a procedure will play an important role on the CoRoT data analysis.

Posters presentations

P-XII-115

THE ROTATIONAL HISTORY OF THE SUN AND OTHER STAR FAMILIES

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Rotation is one of the most important astrophysical observables, driving largely the stellar evolution, including inner and atmospheric phenomena such as the mixing of chemical yields, coronal and cromospheric heating. In addition, in stellar multiple systems rotation may reflects also the strength of tidal effects and the engulfment of stellar or sub-stellar companions. Unfortunately, up to date the treatment of the major questions involving rotation has been limited because of the qualitative and quantitative paucity of measurements of stellar rotation periods. Now, thanks to the high precision data coming from the CoRoT space mission we are able, for the first time, to accomplish a solid study on the evolutionary behavior of stellar rotation, as well as on the role of rotation on mixing mechanisms, activity and binarity in stars of different families. The present work brings the first results of the AcRoCoRoT Team, led by the Federal University of Rio Grande Norte, Natal, Brazil, on the evolutionary behavior of stellar rotation and in consequence of the stellar angular momentum, based on rotation periods computed from the CoRoT light curves.

Posters presentations

P-XII-116

PHOTOSPHERIC MAGNETIC STRUCTURES: SPOT MODELLING AND ANALYSIS OF THE FOURIER SPECTRUM

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CoRoT, thanks to its stability and the high quality of its data, opens new possibilities in terms of investigation of the magnetic activity of stars, through the signature of photospheric magnetic structures in the light curve and in the very low frequency part of its Fourier spectrum.

In fact, spot modelling of stellar light curves is completely renewed with the advent of high-quality photometric measurements. With an almost continuous duty cycle, a very high signal to noise ratio and a duration extending up to 5 months, the CoRoT data allow us to investigate spot modelling in solar-like stars. They reveal spots as small as the large solar spots, with individual signatures of about 100 ppm.

Both spot modelling and the analysis of the Fourier spectrum allow us to measure unambiguously the stellar rotational rate and spots lifetime. For each parameter, error bars are proposed, derived from an extensive analysis of synthetic time series intended to check the reliability of the methods. We will present the global performance we may achieve with CoRoT data, depending on the magnitude of the target, and then the results obtained for bright targets of the seismic field. Evidence of differential rotation is also clearly put in evidence in many targets.

Posters presentations

P-XII-117

IMPROVED 'ROTATION-ACTIVITY' RELATIONS IN LOW-MASS MAIN-SEQUENCE STARS FROM COROT PHOTOMETRY

S. Messina (1), A. Lanzafame (2), S. Galeano (2), A. F. Lanza (1), I. Pagano (1), G. Leto (1)

1 INAF-Catania Astrophysical Observatory Catania, Italy; 2 University of Catania, Catania, Italy

The level of magnetic activity in the photosphere of main-sequence late-type stars depends on the stellar rotation period and the mass. Specifically, as far as the rotation rate and the depth of the convection zone increase, stars display a larger photometric variability amplitude, which arises from an increasing amount of photospheric magnetic fields. Empirical relations which describe such dependences of activity on rotation and mass have been found by Messina et al. (A&A 366, 215, 2001; A&A 410, 671, 2003) by using photometric data of about 265 field stars and members of young open clusters. The available data have a precision of about 1 percent, which does not allow us to extend such relations to the slow rotation regime (P>15d), where the photometric variability hardly reaches 1 percent amplitude. Furthermore, the activity-rotation relation seems to have a discontinuity at about P=1.1d, in the sense that ultra fast (P<1.1d) and fast (P>1.1d) rotators behave differently. Due to the day-night duty cycle of ground-based observations, it turns out to be very difficult to determine reliable rotation periods close to 1 day. The ultra-high precision and uninterrupted time series provided by CoRoT for thousands of late-type main-sequence stars allow us to derive hundreds of new rotation periods at activity levels much lower than those accessible by ground-based observations. The data provided by CoRoT allow us to extend the activity-rotation relation to much slower rotation regimes and to better explore the discontinuity at 1.1 day, the CoRoT time series being free of any significant aliasing effect. Improved rotation-activity relations make feasible direct comparisons between observations and theoretical predictions about the generation and evolution of magnetic fields and their impact on the stellar internal structure.

Posters presentations

P-XII-118

HYDRODYNAMICAL SECULAR TRANSPORT PROCESSES IN ROTATING STARS

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1 Argelander-Institut für Astronomie (Argelander-Institut für Astronomie) , Bonn , Germany ; 2 CEA/DSM/IRSU/Service d'astrophysique (Service d'astrophysique), Gif-sur-Yvette, France ; 3 GRAAL Universite Montpellier 2 CNRS (Astronomy and Astrophysics), Montpellier, France ; 4 IAA ULB Universite Libre de Bruxelles (Astronomy and Astrophysics), Brussels, Belgium ; 5 Reseau quebequoi de calcul de haute performance, Universite de Montreal (DGTIC) (Scientific project department), Montréal, Canada ; 6 Observatoire de Geneve Universite dde Geneve (Astronomy and Astrophysics) , Geneva, Switzerland ; 7 Institut d'Astrophysique et de Geophysique Universite de Liege (Insitut d'Astrophysique et de Geophysique), Liege, Belgium ; 8 Observatoire de Paris LUTH (LUTH), Meudon, France

The development of asteroseismology is providing new insight on rotating stars, and in this context, it is crucial to acquire a profound understanding of the rotation-induced transport processes that strongly affect the evolution of such stars. We will review the main hydrodynamical processes that transport angular momentum, heat and chemicals in stellar radiation zones (namely the meridional circulation, the shear-induced turbulence and the internal gravity waves). Then, using advanced diagnosis tools we have recently developed, we shall examine in detail the mechanisms that are driving each of these processes during the main-sequence, both in low-mass and in massive stars. Perspectives and future developments will be discussed.

SESSION XIII:
The successors of COROT

Oral communications

O-XIII-69

COROT2: A PROGRAM FOR 3 MORE YEARS

A Baglin
LESIA, Observatoire de Paris, Meudon, France

Oral communications
O-XIII-70
INVITED TALK: J. MATTHEWS

MOST IN THE COROT ERA

University Of British Columbia, Department of Physics & Astronomy, Vancouver, Canada

MOST is approaching its sixth birthday in orbit, and its younger, bigger, and very precocious sister, CoRoT, will have recently marked its second birthday in space at the time of this Symposium. The 'parents' of both siblings have already worked together closely. With these two asteroseismology-exoplanetary-science photometry missions in operation, how can they better complement each other and their scientific goals? CoRoT has longer time coverage (and hence better precision and frequency resolution) but more restricted Continuous Viewing Zones (CVZs). MOST has access to brighter stars across a broader swath of the sky, for which detailed follow-up of discoveries (e.g., at IR wavelengths) is possible quickly with existing ground- and space-based facilities. I will present cases where the exciting discoveries in the CoRoT sample can point to (and have already guided) MOST astrophysical science programmes. I will also highlight the potential (and reality) of simultaneous space-based and ground-based observations of bright stars which are pulsating, rotating, eclipsing, and harbouring exoplanets.

Oral communications
O-XIII-71

BRITE-CONSTELLATION ON THE SHOULDERS OF COROT

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1 University of Vienna, Institute of Astronomy, Vienna, Austria; 2 University of Montréal, Département de physique, Montréal, Canada ; 3 IKS, Technical University Graz, Austria

BRITE-Constellation, a project developed since 2003 by researchers1at Canadian and Austrian Universities, presently consists of UniBRITE and BRITE-Austria/TUG-SAT1, which are two 20-cm cube nanosatellites. Each will fly a 30-mm aperture telescope equipped with a CCD camera and either a red (550 to 700 nm) or a blue (390 to 460 nm) filter, to perform high-precision two-color photometry (Fig. 1) of the brightest stars in the sky (4th mag) for up to several years. Stars of up to two magnitudes fainter can be observed simultaneously with reduced accuracy in an on-board photometric mode. Depending on the orbit and the position of the BRITE targets, the photometry can be obtained contiguously during many orbits for many months, with gaps only during individual orbits or certain periods of the year. The primary science goals are studies of intrinsically luminous stars in our neighbourhood (of both high mass during any phase of their lifetime and medium/low mass toward the end of their lifetime), representing objects which dominate the ecology of our Universe and stars that probe the future development of our Sun. The wide-view cameras (24-degree field) will also obtain data from other scientifically interesting stars to investigate their stellar structure and evolution. All of this is enabled by innovative technology currently developed in collaboration between Canada and Austria. A launch of UniBRITE and BRITE-Austria in 2009 is envisioned and an expansion proposal of the BRITE-Constellation by two additional Canadian spacecraft of the same construction is currently under review. With the possibility to observe the same star field for more than 150 days and in two colors, BRITEConstellation exceeds the possibilities of CoRoT, but builds on the experience gained from this mission as well as from MOST, both extremely successful. BRITE-Constellation, being a nanosatellite mission, can only provide similar photometric accuracy per data point for very bright stars, in comparison to the much fainter stars accessible with the much larger and sophisticated CoRoT mission.

1Austria, Graz: B. Josseck, O. Kudelka, M. Unterberger; Vienna: M. Breger, M. Fischer, G. Handler, A. Kaiser, R. Kuschnig, T. Lftinger, N. Nesvacil, A. Scholtz, W.W. Weiss, K. Zwintz.Canada, Montr: A. Moat; Toronto: C. Grant, M. van Kerkwijk, S. Mochnacki, J. Percy, S. Rucinski, R. Zee; Vancouver: J. Matthews.

Oral communications
O-XIII-72

PLANETARY TRANSITS BEYOND COROT: THE CASE FOR DOME C OBSERVATIONS

T. Guillot (1), K. Agabi (2), N. Crouzet (1)

1 OCA, Nice, France; 2 FIZEAU, Nice, France

Guillot1, Agabi2, Crouzet1, Daban2, Gouvret2, Abe2,
Fressin1, Fantei2, Ottogalli2, Rivet1, Schmider2, Peron2, Valbousquet3,
Bondoux4, Chatilla4, Blanc5, Dugu, Roussel2, Assus1, Bresson2, Blazit2,
Le Van Suu5, Merzougui5, Fossat2, Jeanneau2, Rauer6, Erikson6, Pont7,
Aigrain7, Tothill7.1 OCA, CassiopCNRS UMR 6202)2 UNSA, Fizeau (CNRS
UMR 6525)3 Optique & Vision4 IPEV, Concordia5 OHP6 DLR7 Exeter University

The possibility to observe planets in transit in front or even behind their star is a formidable opportunity to study them, in terms of structure, atmospheric properties, meteorology...etc. While the detection of planets in transit is now in a very fruitful phase, and space missions like CoRoT (and in the near future Kepler) push the possibilities of photometry beyond the present limits of ground-based photometry, it is most important to pursue research in this direction and beyond the expected life-time of these space missions. First, a very large ensemble (~1000s) of transiting planets will enable statistical studies to understand planet formation in a way that is not currently possible. Second, the discovery of «Rosetta stone» planets will greatly advance our understanding of these. Third, current space missions are limited in their lifetime and ability to point any target in the sky. Last but not least, groundbased instruments can be modified in function of improvements of observational techniques or strategies. ASTEP (Antarctica Search for Transiting Planets) is a project to photometrically monitor stellar fields at visible wavelength continuously from Dome C, Antarctica, taking advantage of the continuous winter night, extremely good meteorogoly and stable conditions. The first phase of the project, ASTEP South, led to the nearly-continuous observation of the 4_x4_ field of stars centered on the celestial South Pole for more than 1000 hours. The second phase of the project, currently underway, is the development of a pointable40cm Newton telescope and installation at Dome C at the beginning of 2010.

Oral communications
O-XIII-73
INVITED TALK: W.J. BORUCKI, MOFFETT FIELD, USA
KEPLER DATA VALIDATION AND FOLLOW UP PROGRAMS

Oral communications
O-XIII-74
INVITED TALK: C. CATALA

PLATO: PLANETARY TRANSITS AND OSCILLATIONS OF STARS

Observatoire de Paris, LESIA, Meudon, France

The PLAnetary Transits and Oscillations of stars Mission (PLATO) is one of the four M-class mission proposals selected for an assessment study phase in the framework of the ESA "Cosmic Vision» programme. Its objective is to detect and characterize exoplanets by means of their transit signature in front of a very large sample of bright stars, and measure the seismic oscillations of the parent stars orbited by these planets in order to understand the properties of the exoplanetary systems.PLATO is the next-generation planet finder, building on the accomplishments of CoRoT and Kepler: it will observe significantly more stars; its targets will be three magnitudes brighter (hence the precision of the measurements will be correspondingly greater as will be those of post-detection investigations, e.g. spectroscopy, asteroseismology, and eventually imaging); it will be capable of observing significantly smaller exoplanets, as well as planets orbiting hotter stars.These goals will be achieved by a long-term (3 years), high precision, high-time-resolution, high-duty-cycle monitoring in visible photometry of a sample of about 100,000 relatively bright (mV _ 11) stars and another 400,000 down to mV = 13. The space-based observations will be complemented by ground- and space-based follow-up observations. In its current design, the PLATO payload includes an ensemble of 28 identical small, very wide-field telescopes, assembled on a single platform and all looking at the same 26_ diameter field. Each one of these 100mm pupil telescopes has its own CCD focal plane, comprised of 4 CCDs with 3854 x 3854 pixels of 18 microns.
Abstract submitted on behalf of the PLATO Payload and Science Conso

Poster presentations
P-XIII-119

SPECTROSCOPIC STUDY OF SOLAR-LIKE STARS SELECTED FOR CANDIDATES FOR KEPLER ASTEROSEISMIC TARGETS

J. Molenda-Zakowicz (1), A Frasca (2), D Latham (3)

1 Uniwersytet Wroclawski (Instytut Astronomiczny), Wrocław, Poland; 2 Osservatorio Astrofisico di Catania (Institute of Astronomy), Catania, Italy; 3 : Harvard-Smithsonian Center for Astrophysics (Harvard-Smithsonian Center for Astrophysics), Cambridge, USA

We report spectroscopic observations of 23 candidates for Kepler asteroseismic targets and 10 other stars in the Kepler field, carried out at the M.G. Fracastoro station (Serra La Nave, Mount Etna, elevation 1750 m) of the Catania Astrophysical Observatory, Italy, and at the F.L. Whipple Observatory, Mount Hopkins, Arizona. For all these stars, we derive the radial velocities, effective temperature, surface gravity, metalicity, the projected rotational velocity, and estimate the MK type. HIP 97513 and HIP 92132 are classified as suspected new single-lined spectroscopic binaries. For 28 stars, the radial velocity is measured for the first time.

Poster presentations
P-XIII-120

SPECTROSCOPIC CHARACTERIZATION OF EARLY-TYPE KEPLER TARGETS CANDIDATES

G. Catanzaro (1), A. Frasca (1), J. Molenda-Zakowicz (2)

1 Osservatorio Astrofisico di Catania (Institute of Astronomy), Catania, Italy; 2 Uniwersytet Wroclawski (Instytut Astronomiczny), Wrocław, Poland

In this poster we present detailed spectroscopic characterization of 33 early-type candidates for Kepler primary asteroseismic targets. For all these stars, effective temperatures, surface gravities, metallicities, projected rotational velocities, and radial velocities are derived from moderate resolution spectroscopy carried out at the Catania Astrophysical Observatory. Spectral synthesis method has been used to reproduce the observed spectra.

Poster presentations
P-XIII-121

OBSERVATIONS OF TRANSITING EXTRASOLAR PLANETS WITH THE AIU JENA TELESCOPE IN GROSSSCHWABHAUSEN

S. Raetz (1), M. Mugrauer (1), T. Schmidt (1), T. Roell (1), T. Eisenbeiss (1), M. Hohle (1), A. Seifahrt (2), A. Koeltzsch (1), M. Vanko (1), C. Broeg (3), J. Koppenhoefer (4), R. Neuhaeuser (1)

1 Astrophysical Institute and university observatory (Solar and Stellar Physics), Jena, Germany; 2 Institute for Astrophysics (Solar and Stellar Physics), Goettingen, Germany; 3 Space Research and Planetary Sciences, Physical Institute (Solar and Stellar Physics), Bern, Switzerland; 4 Max Planck Institute for Extraterrestrial Physics (Solar and Stellar Physics), Muenchen, Germany

We have started high precision photometric monitoring observations at the AIU Jena observatory in Grossschwabhausen near Jena in fall 2006. Therefore we used the 25 cm Cassegrain telescope equipped with an optical CCD-camera mounted picky-pack on a 90 cm telescope. To test the obtainable photometric precision, we observed stars with known transiting planets. We paid special attention to the accurate determination of transit times in order to identify precise transit timing variations that would be indicative of perturbations from additional bodies and to refine the orbital parameters of the systems. The mean photometric accuracy of the observed stars (V = 11 - 12 mag) with known transiting extrasolar planets is 0.008 mag and the accuracy in the determination of the transit times is ~0.0013 d. This allows us to register transit time variations of around 150 s. Here, we present results for three transiting planets XO-1b, TrES-1 and TrES-2. Our transit observations provide anchors for future searches for transit time variations. This fall we get a new CCD camera for the Schmidt focus of the 90 cm reflector. This camera will have a smaller pixel scale and a higher sensitivity. We will start our own search for planetary transits, where we monitor different fields covering regions of young open clusters. The search will benefit strongly from the new camera.

Poster presentations
P-XIII-122

ACCURACY OF STELLAR PARAMETERS OF EXOPLANET-HOST STARS DETERMINED FROM ASTEROSEISMOLOGY

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1 CRAL-ENS, Lyon, France; 2 University of Exeter, Exeter, UK

In this exciting era of exoplanet discoveries, transiting planets play a crucial role on the understanding of the physics of planetary interior and of planet formation processes. The determination of planetary mean density indeed provide valuable information on heavy element content, inherited from the formation process, and planetary structure. The successful launching of CoRoT provides data with unprecedented accuracy compared to ground-based observations. However, a persistent source of uncertainty on the planetary parameters (mass and radius) stems from the uncertainty on the stellar parameters. In the present paper, we examine the accuracy on the latter parameters that could be obtained using asteroseismology whith the expected accuracy on oscillation frequencies of CoRoT and PLATO. We explore the space of stellar parameters, in terms of mass, effective temperature, luminosity, metallicity and mixing length parameter and we analyse the sensitivity of predicted spectrum of oscillation frequencies to these parameters. We examine the best stellar cases where asteroseismology could improve the identification of planet-host stars. We also discuss the effect of stellar variability on the oscillation frequency determination.

Poster presentations
P-XIII-123

CARMENES: A NEW NIR ECHELLE SPECTROGRAPH FOR EXOPLANET AND ASTEROSEISMOLOGY RESEARCH

P. Amado

Instituto de Astrofísica de Andalucía (CSIC) (Stellar Physics), Granada, Spain

Exoplanets and asteroseismic research has experienced great progress in the past few years with the launch of several photometric space missions, two of them currently flying, and several others coming soon. To help these missions to achieve their science goals, a battery of ground-based multi-site campaigns have been and are being designed and carried out to obtain complementary information to that provided by the space photometry. The expectations of promising results are so high that new techniques never used before are been required to optimize the science results. One of these techniques is high resolution near-infrared spectroscopy. CARMENES (Calar Alto Radial-velocity MEasuring Near-infrared Echelle Spectrograph) is the name of a new spectrograph for the 3.5m telescope at the observatory of Calar Alto, Almeria, Spain. Its two main science cases are the search for exoplanets around very-low-mass stars and asteroseismology. In this presentation, an overview of the instrument and of its main science cases is given.

Poster presentations
P-XIII-124

THE SACY PROJECT IN THE COROT WINDOWS

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The SACY project is a Search for Associations Containing Young stars in the Southern Hemisphere. We use as targets possible optical counterparts from HIPPARCOS project of ROSAT bright sources. The HIPPARCOS or TYCHO-2 stars are used in order to have access to proper motions (and eventually distances) of the stars, to identify possible young kinematical nearby associations. The stars are observed with a high resolution spectrograph to obtain, mainly, radial velocities, temperatures and Li abundances. They are selected having TYCHO colors later than G0, a temperature range where Li may be an age indicator. This enables us to identify these possible associations and in such case we will have better information about the ages of the member stars. The SACY project is almost complete, except for a few tens of stars (we have observed more than two thousand) in the ten degree band north of the equator, a northern extension we decided to add to cover the CoRoT windows. Until now we have detected 14 young nearby associations (younger than 100 Myr and nearer than 150 pc) in the SACY sample. We intend to find out if there is any young association in the CoRoT windows, to have insights into debris disks, planetary formation and early planetary evolution. Unfortunately, the possibilities of finding young associations in the CoRoT windows are becoming low. We will present the new results based on the 2008 observations that give a new insight into this search.

Poster presentations

P-XIII-125

SIAMOIS: GROUND-BASED ASTEROSEISMIC OBSERVATIONS IN 1 SITE IN ANTARCTICA

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SIAMOIS is a ground-based asteroseismology project, to be set up in the Concordia station at Dome C in Antarctica. This place appears to be ideal for ground-based asteroseismic observations, as it is capable of delivering a duty cycle as high as 90\% during the three-month long polar night. Any project for the purpose of asteroseismology must answer the question: ``What can this project achieve that has not been done by the CoRoT or Kepler missions?''. The answer derives from the fact that the scientific program of SIAMOIS is based on the very precise asteroseismic observation of nearby bright targets, focussing on the spectrometric observations of solar-like oscillations. Photometry and spectrometry observations are not sensitive to the same signal in the stellar photosphere. The photometric signal, sounding deeper regions, is sensitive to the different scales of granulation, whereas the spectroscopic lines formed in higher regions are less affected. As a result, the low-frequency domain of the Fourier spectrum is less contaminated by the activity and granulation signals when observed in velocity. Spectrometric observations with SIAMOIS will be able to detect oscillation modes in the low-frequency domain, with much longer lifetimes. Spectrometric measurements also give access to $\ell=3$ oscillation modes that are not seen with photometric data. The Doppler data will then yield a detailed mode structure inversion, thus a high-precision determination of the stellar interior structure. The benefit of precise Doppler observations of nearby targets, with addition of interferometric and high-resolution spectrometric measurements, will allow us to investigate in detail the physical laws governing the stellar interior structure and evolution. The access to nearby stars, to the low-frequency domain, to low-mass targets and to $\ell=3$ modes makes Doppler observation at Dome C complementary to space-borne observations.

Poster presentations

P-XIII-126

LASER AND Z PINCH EXPERIMENTS REVEALING PLASMA PROPERTIES OF SEISMIC PROBES THROUGH THE HR DIAGRAM

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Helio and asteroseismic measurements are convincing probes of the stellar internal dynamics, but the interpretation of the acoustic mode characteristics is largely based on the microscopic description of the stellar plasmas. The precise determination of the helioseismic frequencies has put in evidence some specific signatures which contribute to check the validity of the plasma physics introduced in the stellar structure equations (position of the solar BCZ, subsurface helium content, maxwellian distribution of reactant velocities, screening in nuclear reaction rates) but the present discrepancy in the solar radiative zone justifies the need to separate the different processes and to check some of them in laboratory. This need expands to most of the pulsating stars for which the mechanism of excitation is connected to the kappa or epsilon mechanism and for which the labelling of the observed modes (already numerous with CoRoT) is more puzzling. In the stellar envelopes, noticeable differences between OPAL and OP opacities have direct impact on modelling and frequency predictions. In order to facilitate the interpretation of CoRoT, KEPLER, PLATO and on ground observations, we are developing a laboratory program dedicated to the identification of some plasma properties in stellar conditions: measurement of opacities, turbulence, equation of state on large laser or on Z-pinch facilities. After a status report where seismology appears on one hand like a diagnostic of some plasma properties and on the other hand like a demonstrator of lacking or mixed information, we recall the experiments already performed in US and France in the last decade and more specifically the recent and relevant ones. Then we present our planed program oriented to enrich the interpretation of the asteroseismic observation campaigns. This program will be discussed in the community in 2009. This work will be done in collaboration with CEA/DAM, LLNL and Z-pinch teams

Poster presentations
P-XIII-127

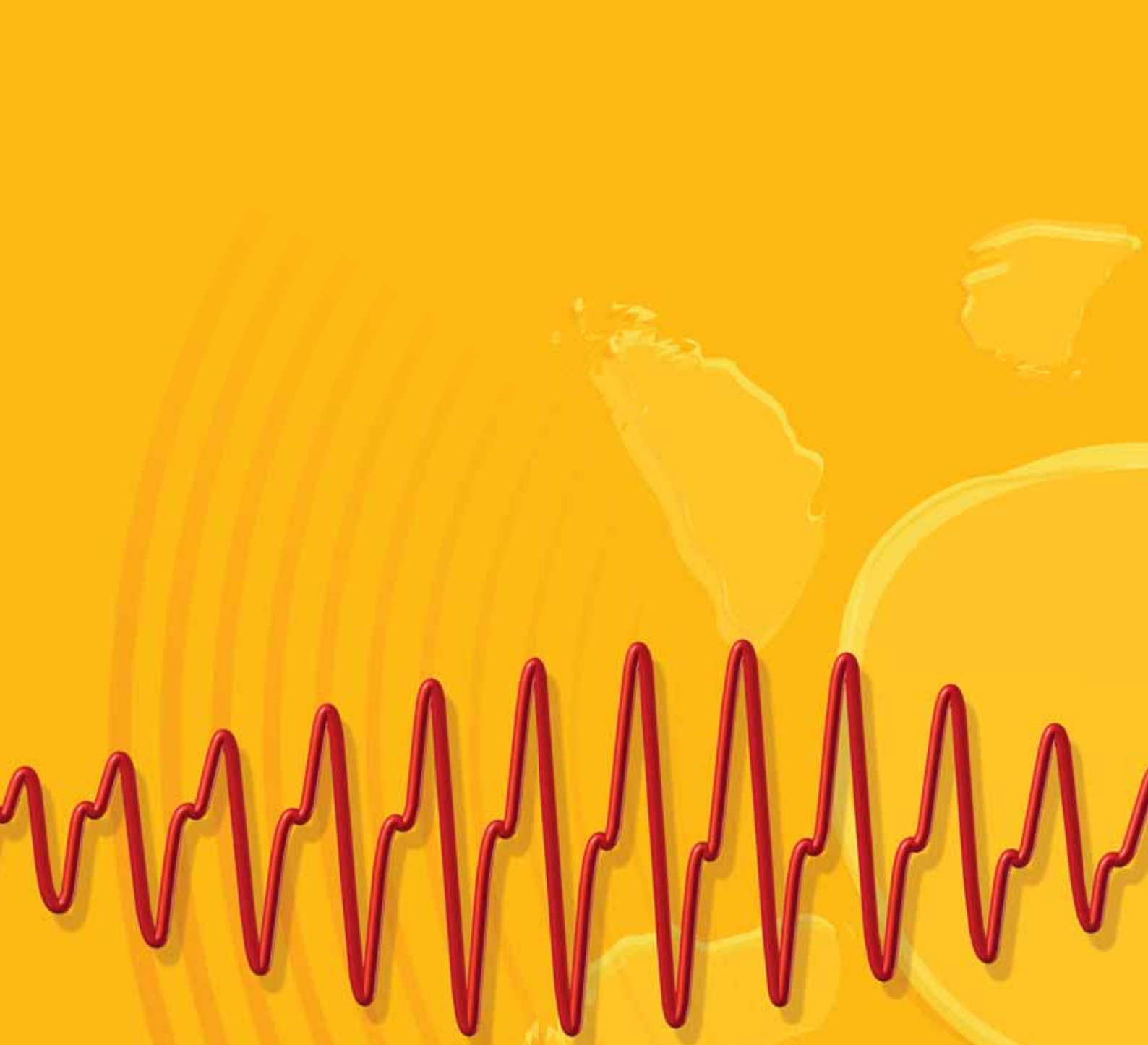
FROM COROT TO PLATO

T. Viard - Thales, Cannes, France

The CoRoT satellite has been launched at the end of year 2006. Since this date, the telescope gives images from sky with a very good ratio of straylight (less than 9 photons / pixel / s). However, it was not obvious for the orbit of CoRoT (around 800 km) to reach such very low level of straylight coming from Earth which correspond roughly to an extinction ratio of 1012.
Thales Alenia Space was in charge to the telescope development and was responsible of its optical quality. A two stages baffling concept has been designed and proposed in order to comply with the very stringent requirements of CoRoT. A description of the baffling concept will be given in the paper. Once straylight problem resolved, the obtaining images is ensured by a camera which enable to have a good optical quality over a large field of view. Such concept of camera is also well adapted for the future ESA mission PLATO. As a matter of fact, we find on PLATO the same wavelength range and the same PSF constraints than CoRoT. The differences are mainly in the orbit (L2) and in the SNR requirements; it is why Thales Alenia Space proposes on PLATO a concept based on several CoRoT cameras (between 30 and 60) but without two stages baffle due to the advantageous L2 environment. A description of what could be the design of PLATO payload will be given in the paper.

SESSION XV:
Revelations of the micromagnitude revolution

Oral communications
O-XV-75
INVITED CONFERENCE REVIEW, INVITED TALK: D. KURTZ (PRESTON, UK)
LES RÉVÉLATIONS DE LA RÉVOLUTION / REVELATIONS OF THE MICROMAGNITUDE REVOLUTION



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P r o g r a m m e

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