CS39 - recent results, papers in prep.(Seismo)

Since Last CS39, april 2011

accepted since last SC38:-…

- Papics et al (*2 early B stars caracterized spectroscopically at the top of Beta Cephei IS, not found pulsating…one rotating fast, one slowly; showing rotation modulation 'spots or chemical inhomogeneity*) accepted in A&A

- Briquet et al.*:a O9V star within NGC2244, observed 34 days showing Beta Cephei pulsations. Comparison with models suggest overshooting (dov=0.1) necessary AND modes theoretically not excited…* accepted in A&A

- Baudin et al. 'Amplitudes and lifetimes of solar-like oscillations observed with CoRoT – Red Giant vs main seq stars'; *Extension to red giants of the work started on MS solar-like intending to compare theoretical vs observed amplitudes and lifetimes of the modes. Based on ~300 red giants from LRc01…* accepted in A&A

- Ballot et al. :*HD52265 : solar-like target with a known planet; very good observational results*. accepted in A&A

Submitted …

- Degroote et al. submitted to A&A: CoRoT's view on variable B8/9 stars: spot versus pulsations – *discussion of rotational modulation signature and possible differential rotation.*

Accepted ?

…Submitted …

-Blomme et al submitted to A&A: Variability in the CoRoT photometry of three hot O-type stars. …*A substantial number of of frequency peaks is listed but none can be convincingly identified as being connected with pulsation however models suggest modes should be excited. The spectrum is dominated by red noise looking of different aspect and origine than oscillations seen on cooler O stars..*

accepted

-Baudin et al. submitted to A&A: High mass red giant HD50890: *a G6 Red Giant (seismo field) observed 55days, only l=0 modes visible, LS=1.7microHz -> modelling point toward a massive (3-5Mo) red giant clearly above the clump, suggesting phase of ascension of RG branch (age~150My), or later phase of He burning;…best models suggest mixing length parameter value smaller than for the Sun and an amount of overshoot on MS ~0.2Hp.*

resubmitted

In Prep:

Solar-like (Obs): HD169392 (cea+, before summer 11) ---- HD169556(QMWF+,before summer),;----- HD43587(IAS+,…),…---- Gizon et al to be submitted…: Asteroseismic constraints on the exoplanetary system HD 52265.

CoRoT Symp 2

CoRoT Symp 2

Solar-like (theo): HD49385 (OP+, before summer);------ HD49933 (OP+, before summer)

accepted

CoRoT Symp 2

Be stars: HD49330.----- HD 181231: two theoretical interpretation papers in prep (OP+, summer 2011)

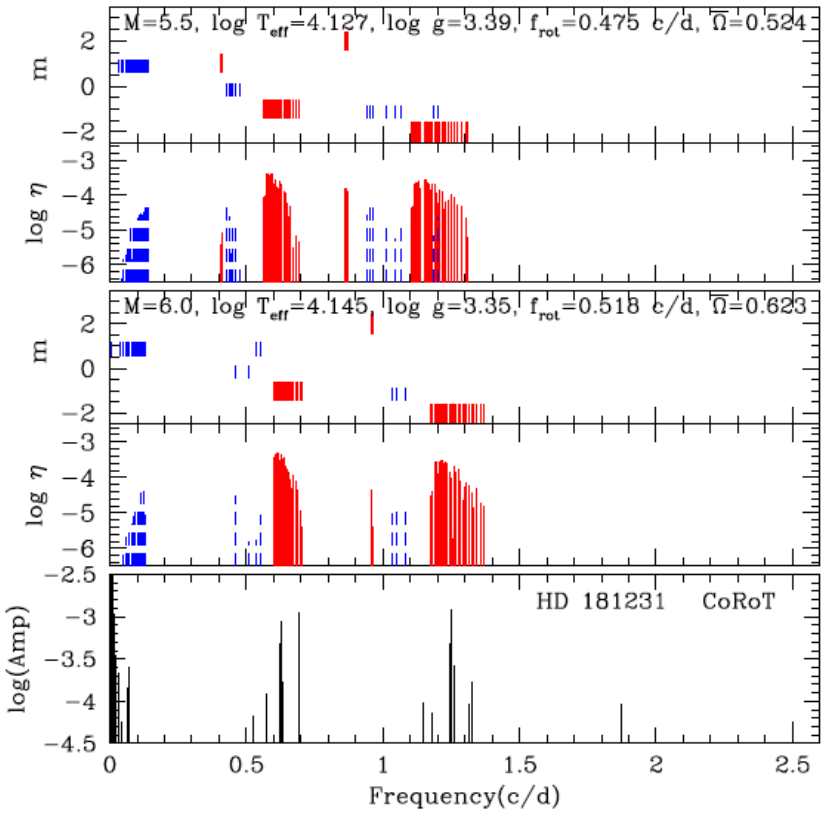
submitted

+ Beta Ceph HD18642, Modelling and seismic interpretation (Aerts et al. 2011 A&A)

accepted

Seismic modelling of the late Be stars HD 181231 and HD 175869 observed with CoRoT: a laboratory for mixing processes.*

C. Neiner[1], S. Mathis[2,1], H. Saio[3], C. Lovekin[4,1], P. Eggenberger[5], and U. Lee[3]



7. Conclusions

Using various state-of-the-art codes to model CoRoT observations of pulsations in two rapidly-rotating late Be stars, we have shown that these stars host prograde sectoral g modes as well as possible r modes.

With these models as well as theoretical calculations, we have also shown that strong mixing is present in these stars. Part of the mixing is due to penetrative convection at the top of the convective core with a possible contribution of excited internal waves. The rest of the mixing is due to rotational processes in particular the meridional circulation and shear-induced turbulence due to the radiative envelope differential rotation and the centrifugal flattening.

Finally, we have shown that magnetic fields have no influence on internal mixing in rapidly rotating stars such as Be stars.

Seismic modelling of the β Cep star HD 180642 (V1449 Aql)

C. Aerts[1,2], M. Briquet[1,3,⋆], P. Degroote[1], A. Thoul[4,⋆⋆], and T. Van Hoolst[1,5]

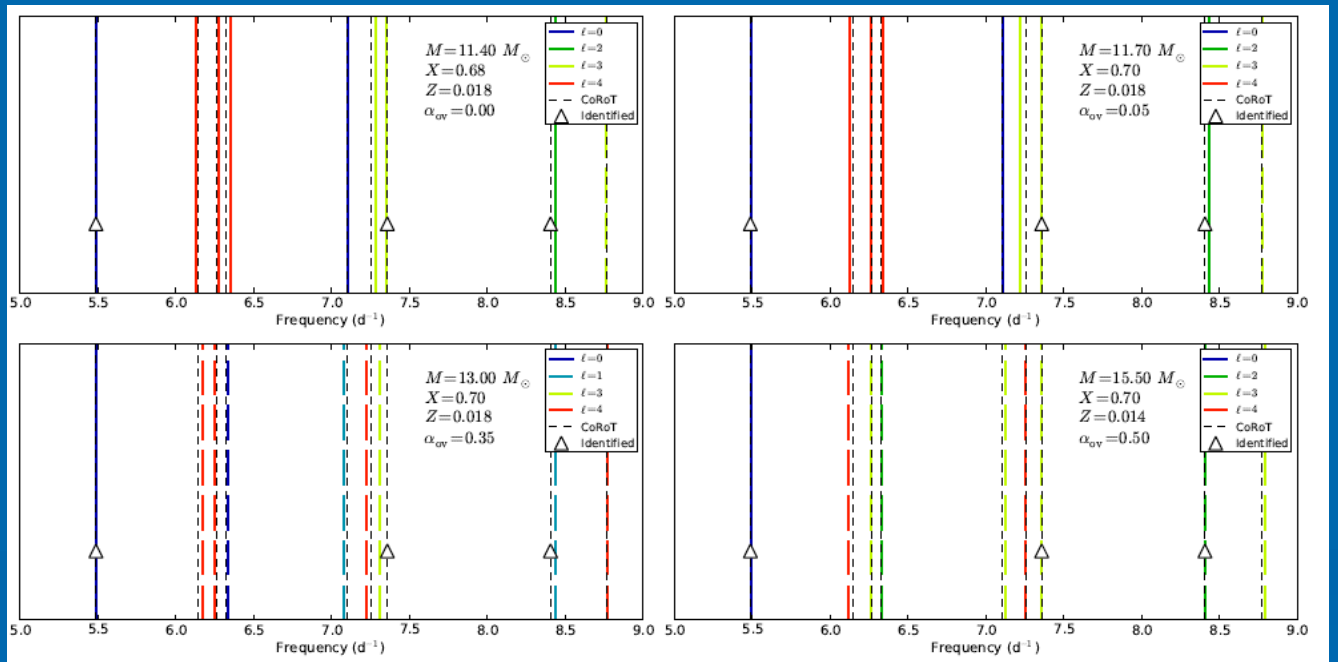
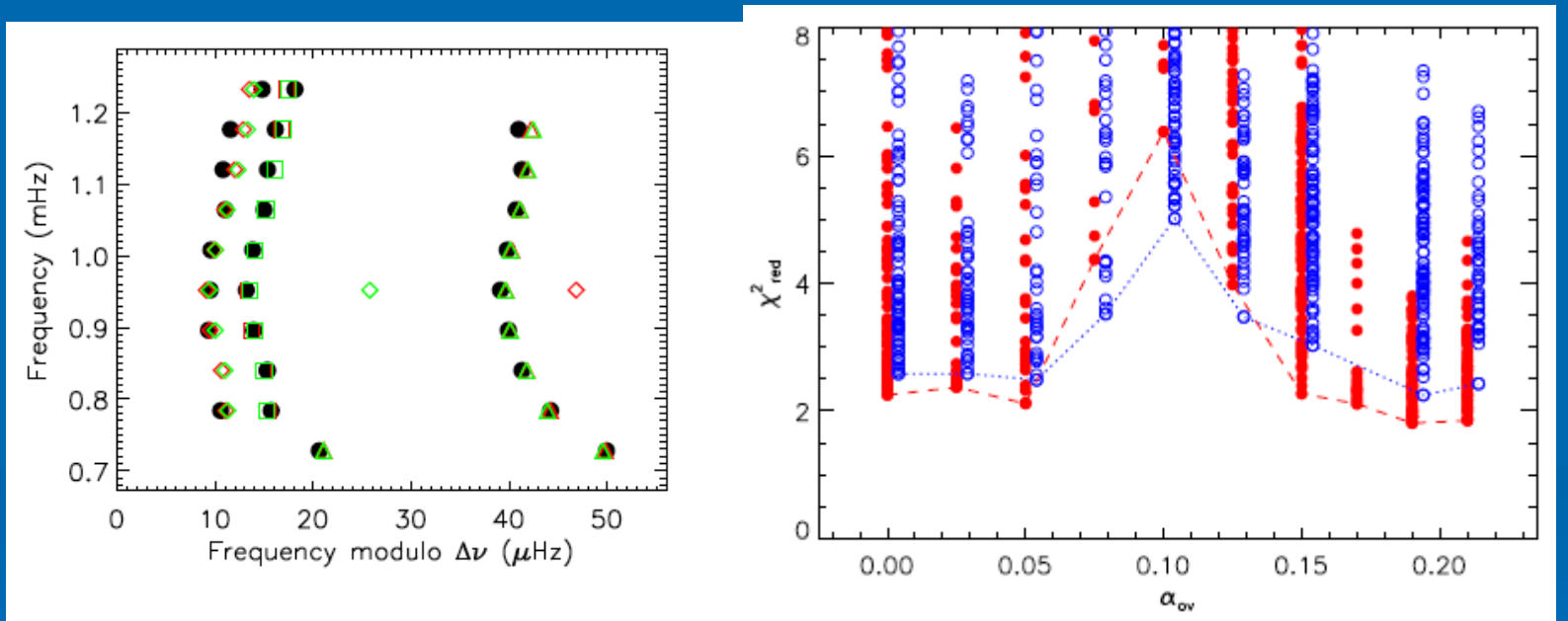


Fig. 1. Models with predicted oscillation frequencies fitting the nine detected frequencies and fulfilling the mode identification as listed in Table 1. In the four upper panels, the dominant mode is the radial fundamental while in the lower left panel it is the first

Results. We find models that are able to explain the numerous observed oscillation properties of the star, for a narrow range in mass of 11.4–11.8 $M_\odot$ and no or very mild overshooting (with up to 0.05 local pressure scale heights), except for an excitation problem of the $\ell = 3$, p_1 mode. We deduce a rotation period of about 13 d, which is fully compatible with recent magnetic field measurements. The seismic models do not support the earlier claim of solar-like oscillations in the star. We instead ascribe the power excess at high frequency to non-linear resonant mode coupling between the high-amplitude radial fundamental mode and several of the low-order pressure modes. We report a discrepancy between the seismic and spectroscopic gravity at the 2.5σ level.

Constraints on the structure of the core of subgiants via mixed modes: the case of HD 49385

S. Deheuvels[1,2] and E. Michel[1]



Left: Échelle diagrams of the best models with low overshooting (green) and with high overshooting (red).

Results. The detection of mixed modes leads us to establish the post-main-sequence status of HD 49385. The mixed mode frequencies suggest a strong coupling between the p-mode and g-mode cavities. As a result, we show that the amount of core overshooting in HD 49385 is either very low ($0 < \alpha_{ov} < 0.05$) or moderate ($0.18 < \alpha_{ov} < 0.20$). The mixing length parameter is found to be significantly lower than the solar one ($\alpha_{CGM} = 0.55 \pm 0.04$ compared to the solar value $\alpha_{\odot} = 0.64$). Finally, we show that the revised solar abundances of Asplund give a better agreement than the classical ones of Grevesse & Noels. At each step, we investigate the origin and meaning of these seismic diagnostics in terms of the physical structure of the star.