
APWG Report

APWG last 12 months

- Reply to circular: 17 papers ranging from already “published” to “in preparation”
- ADS for 2011: 25 citations (30% from 83)
  - refereed Journals: 15
  - non-refereed Journals: 5
  - preprints (astro-ph): 5
- Thematic spectrum (25 ADS):
  - rotation, activity, spots: 8
  - “classical” pulsators ((non-)stochastic): 12
  - binaries, EB: 3

Reply to circular:

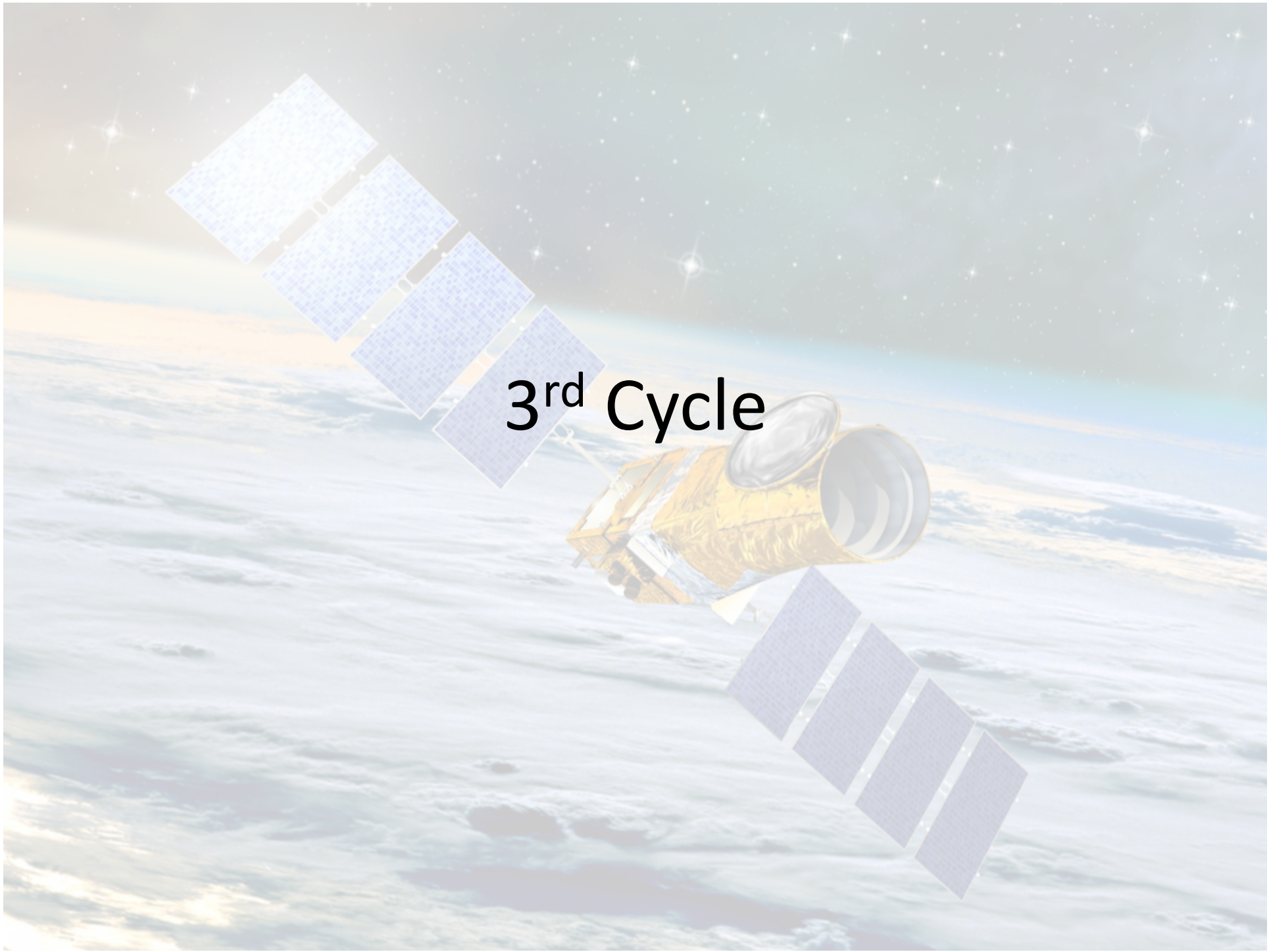
- Search For Small Trans-Neptunian Objects Using COROT Asteroseismology Lightcurves: C.-Y. Liu, et al. - Europlanet meeting
- The detection of a brown-dwarf transit in COROT photometry: Strassmeier et al., in prep.
- Stellar rotation and spot activity in the open cluster IC4756: Strassmeier et al., in prep.
- Photospheric activity, rotation and star-planet interaction of the planet-hosting star CoRoT-6: Lanza A. F., et al. 2011, A&A 525

- Time evolution and rotation of starspots on CoRoT-2 from the modellingof transit photometry: Adriana Valio and A. F. Lanza, Astronomy & Astrophysics, 529, 36, 2011
- Properties of Starspots on CoRoT-2: Adriana Valio, et al., Astronomy & Astrophysics, 510, 25, 2010
- Spot characteristics and differential rotation of the planet-hosting stars CoRoT-4 and CoRoT-6 from transit photometry? Adriana Valio and A. F. Lanza, in prep.
- Stellar Rotation in the CoRoT Era: J. R. De Medeiros and CoRoT Team, to be submitted to A&A
  This study presents the behavior of rotation along the HR-Diagram

- Study of a sample of faint Be stars in the first exofields (IR1, LRA1, LRC1) of CoRoT - I. Spectroscopic characterization: T. Semaan, et al., in prep.
- Study of a sample of faint Be stars in the first exofields (IR1, LRA1, LRC1) of CoRoT - II; Pulsational properties: T. Semaan, et al. in prep.
- Spectral and photometric study of Be stars in the first exoplanet fields of CoRoT: T.Seeman et al. IAU Symp. 272, poster
- An Overview of Sinusiodal Variability with the CoRoT Satellite: J. R. De Medeiros, et.al., to be subm. A&A
  This is the first paper in the CoRoT/Natal rotation program and brings Sinusiodal periods for some 5000 stars

- Exo-binaries with pulsating component: C. Maceroni, in prep
- Ten CoRoT Eclipsing binaries: Photometric solutions: S. C. Maciel, et al., New Astronomy (2011) (CoRoT public data)
- Sixty CoRoT Eclipsing binaries: Photometric solutions: S. C. Maciel and J. R. De Medeiros, submit. ApJ (CoRoT public data)
- Using the Wavelet technique to disentangle activity and oscillations in CoRoT eclipsing binaries: J. P. Bravo and J. R. De Medeiros, to be submitted to A&A by December 2011, (CoRoT public data)

- Binary and planet candidates in the CoRoT short runs: I. C. Leão, et al., to be submitted to A&A (CoRoT public data)
- Periodicity Search as a tool for disentangling the contaminated color light curve of CoRoT 102781750: Paparo et al. 2011, A&A
- Monitoring a high–amplitude δ Sct star for 152 days: discovery of 12 additional modes and modulation effects in the light curve of CoRoT 10115531: Poretti et al. 2011, A&A


3rd Cycle

3rd CoRoT Cycle

ECLIPSING BINARIES (EB) IN THE COROT SPACE MISSION: C. Maceroni, INAF

- EB's are the most numerous sample among the regular variables observed by CoRoT. The large majority of EBs is found in the exoplanet program archives.
- EB's allow to derive absolute stellar parameters (masses, radii) with **A PURELY GEOMETRICAL METHOD** and with accuracy better than 1%. The constraints of same age and chemical composition of the components allows to tests assumptions of stellar evolution models (e.g. overshooting, treatment of convection, role of magnetic field, etc.).

Achievements

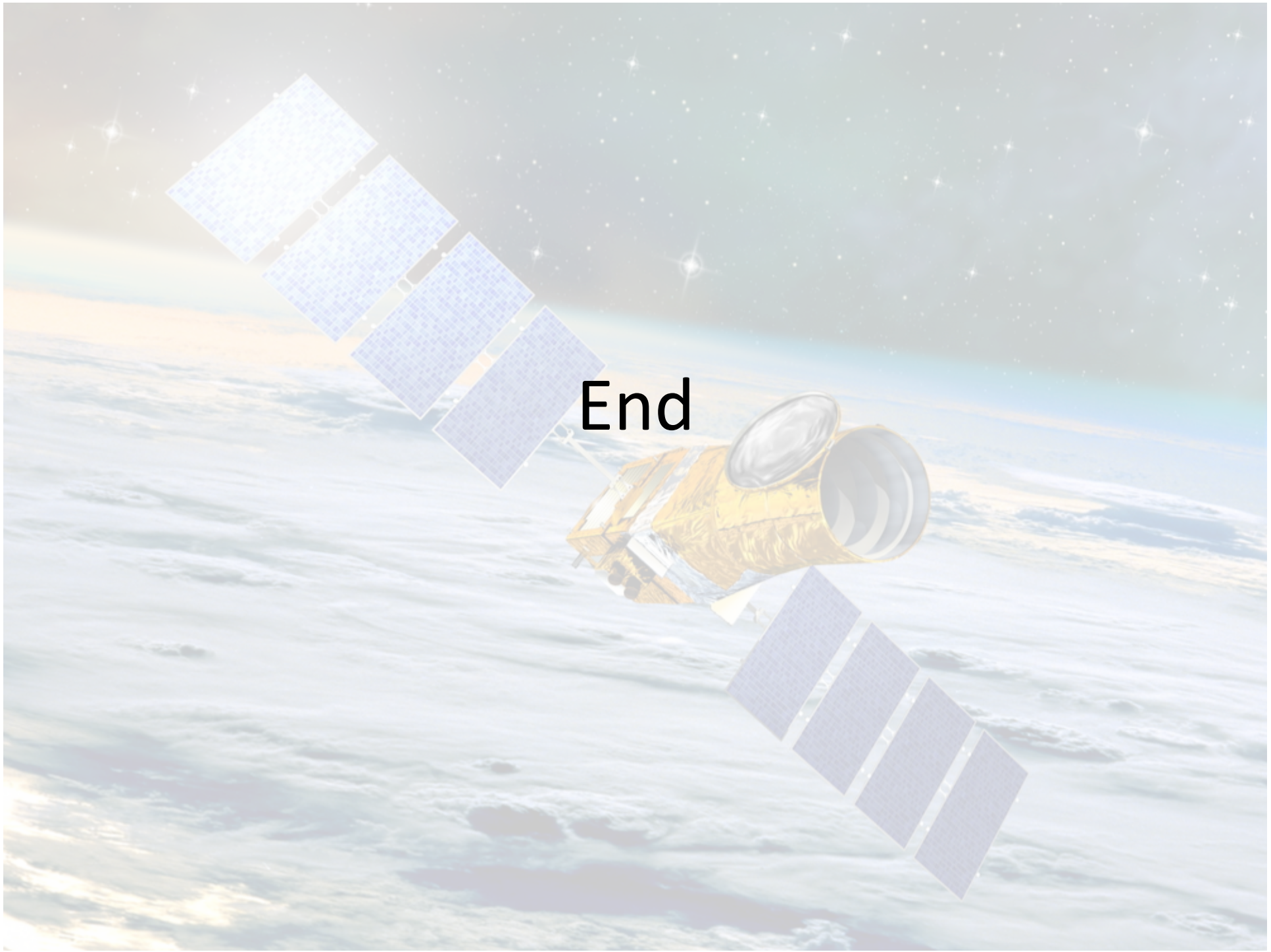
- Substantial increase of the number of binaries with (non radial) pulsating components of all types
- Detection and characterization of EBs containing γ Dor pulsators
- Tidally induced pulsation, specifically in a short period eccentric binary with twin B-type components (HD 174884)
- Solar-like oscillations in a massive O-type star (HD 46149)
- Full modelling of the complex system AU Mon (Algol type)

EB's and CoRoT 3

- **Binarity** is an additional OPPORTUNITY for asteroseismic analysis (constrains on mass & radius.
- Test of **scaling relation** (providing stellar masses and radii) of solar-type pulsators. Comparison of asteroseismology values with the independent ones from eclipsing or interferometric binaries.
- **Tidally induced pulsation** – preferably hot stars to balance Kepler.
- **Relativistic Beaming** induced by the stellar motion relative to observer
- Comparison of EB **statistics at different galactic regions** than Kepler

More 3rd CoRoT Cycle Topics

- Stellar Rotation, spots and differential rotation, activity, interaction of surface effects with planets (*several*)
- Simultaneous spectroscopic and photometric observations of stars with magnetic field (*Frederic Baudin*)
- RR Lyr & Blazhko (*Margit Paparo et al.*)
- Re-observation to extend time base (LPVs, CP, activity cycles, etc., *several*)
- Clumpy interstellar dust obscuring background stars (relative motion of earth and background: *Jean Schneider*)
- Astrometry (cluster membership, *Ernst Paunzen*)

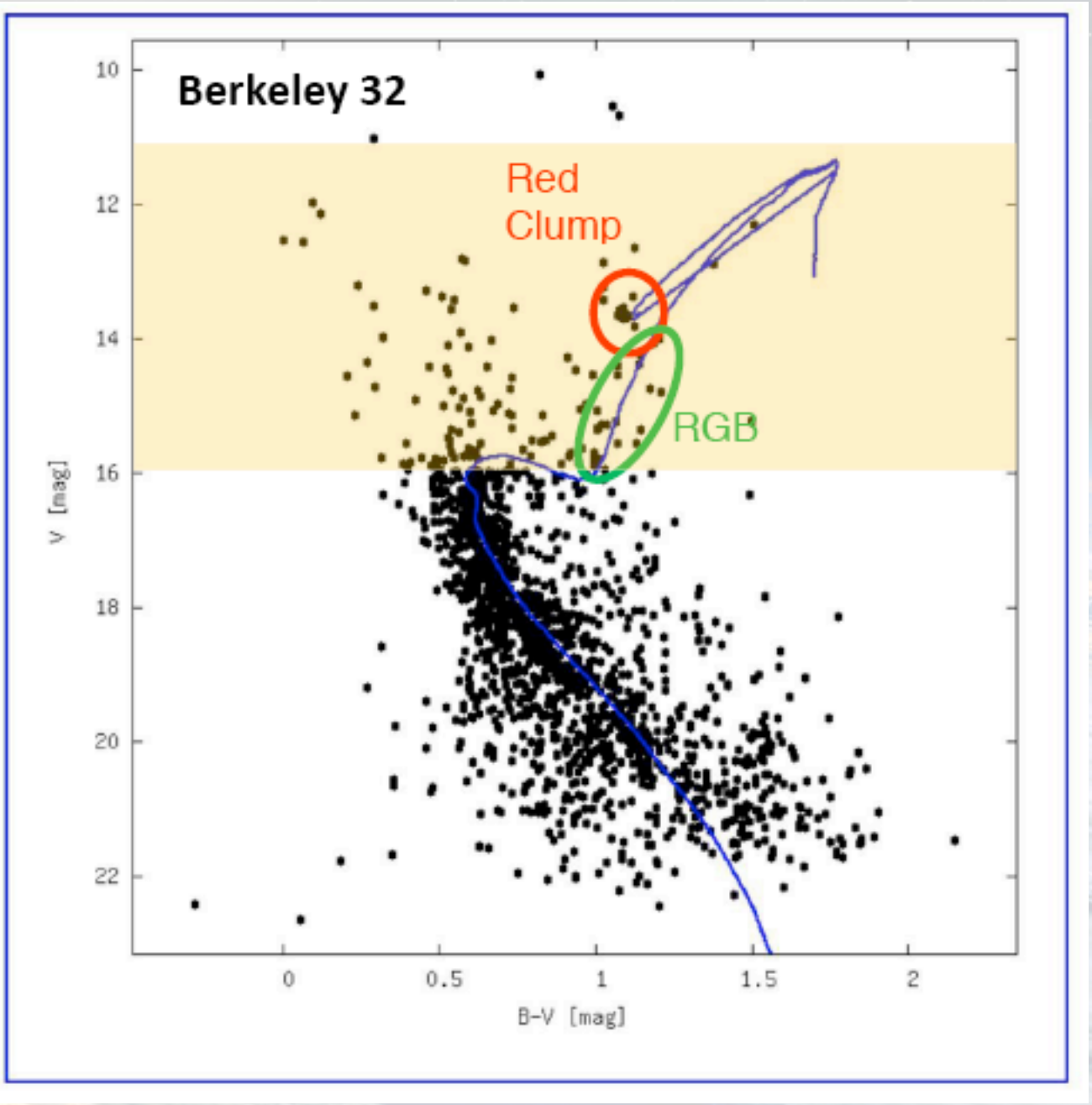

End

3rd CoRoT Cycle

ID	Alpha	delta	dist (pc)	log(age)	Fe/H	Priority
Berkeley 32	06 58 06	06 26 00	3100	9.53	-0.5	1
Collinder 110	06 38 24	02 01 00.	1950	9.2	0.0	2
NGC 2236	06 29 39	06 49 48	2930	8.54	-0.30	2
NGC 6705	18 51 05	-06 16 12	1877	8.3	+0.13	2

1. Strong constraint on the age, and Metallicity leading to a stringent seismic modeling of the star.
2. Ability to determine the mass of the turn-off point through isochrone fitting, which can be compared with the asteroseismic mass of the giants, to constrain the mass-loss (Miglio et al. 2011, MNRAS)
3. For NGC 2236, Cr110, and NGC6705 the turn-off point is in the mass range where one expects the occurrence of the secondary clump to be sensitive to the overshoot on the MS. The latter could therefore be constrained.

4. A seismic estimate of the He abundance in giants would allow to constrain an otherwise free parameter in isochrone fitting. This will allow to better pinpoint the age of the cluster.
5. Strong constraints on the fundamental parameters are very important to derive accurate scaling laws and validate them.
6. The low metallicity of Berkeley 32 ([Fe/H]=-0.5) coupled to constraints on the mass and luminosity of the cluster members, will allow to check the metallicity dependence of the amplitude of solar-like oscillations (Samadi et al. 2010, A&A, 509, 15 and Samadi et al. 2010, A&A, 509, 16).
7. Even in the context of *Kepler* observations, Berkeley 32 would represent a cornerstone to check seismic scaling relations for metal poor stars (no metal---poor clusters in Kepler's FOV).


Berkeley 32
Red
Clump
RGB
V [mag]
B-V [mag]
10
12
14
16
18
20
22
0
0.5
1
1.5
2