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# 1 Abstracts of recently accepted papers
*Resumos de artigos aceites recentemente*

## Mercury's capture into the 3/2 spin–orbit resonance including the effect of core–mantle friction

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The rotation of Mercury is presently captured in a 3/2 spin–orbit resonance with the orbital mean motion. The capture mechanism is well understood as the result of tidal interactions with the Sun combined with planetary perturbations [Goldreich, P., Peale, S., 1966. Astron. J. 71, 425–438; Correia, A.C.M., Laskar, J., 2004. Nature 429, 848–850]. However, it is now almost certain that Mercury has a liquid core [Margot, J.L., Peale, S.J., Jurgens, R.F., Slade, M.A., Holin, I.V., 2007. Science 316, 710–714] which should induce a contribution of viscous friction at the core–mantle boundary to the spin evolution. According to Peale and Boss [Peale, S.J., Boss, A.P., 1977. J. Geophys. Res. 82, 743–749] this last effect greatly increases the chances of capture in all spin–orbit resonances, being 100% for the 2/1 resonance, and thus preventing the planet from evolving to the presently observed configuration. Here we show that for a given resonance, as the chaotic evolution of Mercury's orbit can drive its eccentricity to very low values during the planet's history, any previous capture can be destabilized whenever the eccentricity becomes lower than a critical value. In our numerical integrations of 1000 orbits of Mercury over 4 Gyr, the spin ends 99.8% of the time captured in a spin–orbit resonance, in particular in one of the following three configurations: 5/2 (22%), 2/1 (32%) and 3/2 (26%). Although the present 3/2 spin–orbit resonance is not the most probable outcome, we also show that the capture probability in this resonance can be increased up to 55% or 73%, if the eccentricity of Mercury in the past has descended below the critical values 0.025 or 0.005, respectively.

Accepted by: Icarus, Volume 201, Issue 1, p. 1-11 (2009)
http://de.arxiv.org/abs/0901.1843

## Asteroseismic analysis of the roAp star $\alpha$ Circini: 84d of high-precision photometry from the WIRE satellite

Bruntt, H.[1]; Kurtz, D. W.[2]; Cunha, M. S.[3]; Brandão, I. M.[3,4]; Handler, G.[5]; Bedding, T. R.[1]; Medupe, T.[6,7]; Buzasi, D. L.[8]; Mashigo, D.[6]; Zhang, I.[6]; van Wyk, F.[7];

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We present a detailed study of the pulsation of $\alpha$Circini, the brightest of the rapidly oscillating Ap stars. We have obtained 84d of high-precision photometry from four runs with the star tracker on the WIRE satellite. Simultaneously, we collected ground-based Johnson B observations on 16 nights at the South African Astronomical Observatory. In addition to the dominant oscillation mode at 2442$\mu$Hz, we detect two new modes that lie symmetrically around the principal mode to form a triplet. The average separation between these modes is $\Delta f = 30.173 \pm 0.004\mu$Hz and they are nearly equidistant with the separations differing by only 3.9 nHz. We compare the observed frequencies with

theoretical pulsation models based on constraints from the recently determined interferometric radius and effective temperature, and the recently updated Hipparcos parallax. We show that the theoretical large separations for models of $\alpha$Cir with global parameters within the $1\sigma$ observational uncertainties vary between 59 and 65$\mu$Hz. This is consistent with the large separation being twice the observed value of $\Delta$f, indicating that the three main modes are of alternating even and odd degrees. The frequency differences in the triplet are significantly smaller than those predicted from our models, for all possible combinations of mode degrees, and may indicate that the effects of magnetic perturbations need to be taken into account. The WIRE light curves are modulated by a double wave with a period of 4.479d, and a peak-to-peak amplitude of 4mmag. This variation is due to the rotation of the star and is a new discovery, made possible by the high precision of the WIRE photometry. The rotational modulation confirms an earlier indirect determination of the rotation period. The main pulsation mode at 2442$\mu$Hz has two sidelobes split by exactly the rotation frequency. From the amplitude ratio of the sidelobes to the central peak, we show that the principal mode is consistent with an oblique axisymmetric dipole mode (l = 1, m = 0) or with a magnetically distorted mode of higher degree with a dominant dipolar component.

Based on observations at the South African Astronomical Observatory.

Accepted by: Monthly Notices of the Royal Astronomical Society (2009)
http://de.arxiv.org/abs/0903.3967

## Photometric and spectroscopic detection of the primary transit of the 111-day-period planet HD 80 606 b

Moutou, C.[1]; Hébrard, G.[2]; Bouchy, F.[2,3]; Eggenberger, A.[4]; Boisse, I.[2]; Bonfils, X.[4]; Gravallon, D.[3]; Ehrenreich, D.[4]; Forveille, T.[4]; Delfosse, X.[4]; Desort, M.[4]; Lagrange, A.-M.[4]; Lovis, C.[5]; Mayor, M.[5]; Pepe, F.[5]; Perrier, C.[4]; Pont, F.[6]; Queloz, D.[5]; Santos, N. C.[7]; Ségransan, D.[5]; Udry, S.[5]; Vidal-Madjar, A.[2];

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We report the detection of the primary transit of the extra-solar planet HD 80 606 b, thanks to photometric and spectroscopic observations performed at the Observatoire de Haute-Provence, simultaneously with the CCD camera at the 120-cm telescope and the SOPHIE spectrograph on the 193-cm telescope. We observed the whole egress of the transit and partially its central part, in both datasets with the same timings. The ingress occurred before sunset so was not observed. The full duration of the transit was between 9.5 and 17.2 h. The data allows the planetary radius to be measured (Rp = 0.9 $\pm$ 0.10 R$_{Jup}$) and other parameters of the system to be refined. Radial velocity measurements show the detection of a prograde Rossiter-McLaughlin effect, and provide a hint of a spin-orbit misalignment. If confirmed, this misalignment would corroborate the hypothesis that HD 80 606 b owes its unusual orbital configuration to Kozai migration. HD 80 606 b is by far the transiting planet on the longest period detected today. Its unusually small radius reinforces the observed relationship between the planet radius and the incident flux received from the star and opens new questions for theory. Orbiting a bright star (V=9), it opens opportunities for numerous follow-up studies.

Accepted by: Astronomy and Astrophysics, Volume 498, Issue 1, 2009, pp.L5-L8
http://de.arxiv.org/abs/0902.4457

# 2 Meetings and conferences
*Reuniões e encontros*

## Reionization to Exoplanets: Spitzer's Growing Legacy

October 26-28 2009, Hilton Hotel, Pasadena CA

http://ssc.spitzer.caltech.edu/mtgs/spitzer2009

You are cordially invited to participate in the 2009 Spitzer Science Center Conference.

This meeting will occur shortly after the end of Spitzer's highly successful cryogenic mission, and at the start of the Spitzer warm mission. The meeting will celebrate the accomplishments of the cryogenic mission, and assess future opportunities in the fields where Spitzer's impact has been greatest. In particular, the meeting will be organized into five half day sessions, with each session focusing on a single science topic. The five session topics are:

1. Exoplanets and Exoplanetary Systems (planets, atmospheres, planetary systems, solar system)
2. Star Formation (molecular cloud cores, protoplanetary and debris disks, planet formation)
3. The Dusty Universe (nearby galaxies, starbursts, (U)LIRGs, sub-mm galaxies, AGNs)
4. The Early Universe (structure and galaxy formation, young galaxies, star formation, stellar populations)
5. The Galaxy (Galactic structure, interstellar medium)

The oral program will consist entirely of invited reviews. All other attendees are urged to submit poster presentations on any aspect of astrophysical theory or observations related to the Spitzer mission.

We are happy to announce that conference registration is now open. Please register at:

http://ssc.spitzer.caltech.edu/mtgs/spitzer2009/registration.html

Deadlines:
Early registration ($300) closes: 15 August 2009
Late registration ($350) closes: 16 October 2009

The registration fee includes conference attendance, opening reception, refreshments, banquet, and the conference proceedings. Additional fees are charged for extra banquet guests (beyond yourself) and transportation for the Griffith Observatory field trip. (The fee discount coupon is only for invited speakers, and should be ignored by everyone else.)

Hotel registration is separate; remember to book your room at the Hilton by the September 24th deadline to get the special conference rate.

Please enter your poster abstract (if any) on the registration form. Make sure that it is carefully spell-checked, since it will be linked to the conference website. We will try to accommodate all posters related to the conference theme, space allowing.

After you finish filling out the registration form, you will be redirected to the authorize.net website to pay for registration plus any other fees by credit card.

If you have any questions about registration, please send email to spitzer2009@ipac.caltech.edu

We look forward to seeing you in October!

Sincerely yours,

The Spitzer 2009 Conference SOC and LOC

## From Circumstellar Disks to Planetary Systems

November 3-6 2009, Garching

An ESO-MPE-MPA-USM workshop

The study of circumstellar disks and the formation of planetary systems is experiencing enormous progress in recent years. Thanks to wide-field imaging surveys with the Spitzer Space Telescope and ground-based near-infrared and submillimeter telescopes, unbiased samples of thousands of young stellar objects with disks down to 0.01 $L_{\odot}$ (brown dwarf regime) have been identified in the nearest molecular clouds. High angular resolution observations provide key insight into disk structure and evolution. New and exciting developments range from the characterization of disks in the embedded phase to the development of gaps and holes in a new set of transitional disks, and the direct detection of (proto)planets around pre-main sequence stars.

The goals of the workshop will be to review the status of the field and to discuss transformational programs that will be made possible with upcoming facilities. We propose to bring together the communities working with ground based infrared large telescopes and interferometers, with space observatories and millimeter interferometers as well as theorists.

Main science topics include

- Properties of circumstellar disks across the stellar mass spectrum
- Evolution of protoplanetary disks
- Chemistry in disks (gas phase and solids)
- Initial phases of planet formation
- Young (proto)planets
- Planet-disk interactions
- Debris disks

For more information and scientific rationale, see http://www.eso.org/sci/meetings/disks2009/index.html

Important dates:

- Closing dates for abstracts: July 1 2009
- Closing date for registration: September 10 2009

## XIX ENAA 15-17 Julho 2009 Aveiro

Segundo Anúncio

O próximo Encontro Nacional de Astronomia e Astrofísica de 2009 ocorrerá em Aveiro, no Campus Universitário, continuando assim a tradição de descentralizar o ENAA pelo território nacional. O encontro terá uma duração de 3

dias, permitindo assim frutuosas discussões e longas degustações de ovos moles.

Mais informações podem ser encontradas no endereço:
http://www2.fis.ua.pt/ENAA

# 3 Calls for proposals
*Chamadas para propostas*

## CALL FOR X-shooter SCIENCE VERIFICATION OBSERVATIONS

X-shooter is the first of the 2nd-generation VLT instruments and offers the unprecedented possibility of simultaneous spectroscopy between the UV atmospheric cutoff (300nm) to the near IR (2.5 microns) in one shot at resolutions ranging from R=3000 to R=12000. A full description of the instrument is available here: http://www.eso.org/sci/facilities/paranal/instruments/xshooter/overview.html

X-shooter went through three commissioning runs between November 2008 and March 2009 and is offered to the community for Period 84, for which we received a very large number of proposals. In line with the VLT Science Operations Policy, X-shooter will be offered to the community for two Science Verification (SV) runs in June and August 2009, for about 10 nights. The observations will be carried out in Service Mode by a dedicated team of ESO astronomers who will also assist PIs in the preparation and optimization of the OBs. The standard practice for SV data, is that all data are made public worldwide immediately after passing the usual quality control checks. Proposals will be allocated time on the basis of scientific merit and feasibility. The X-shooter exposure time calculator should be used to estimate the exposure times. A special LaTex proposal template can be downloaded here: http://www.eso.org/sci/activities/vltsv/x-shootersv/Xshooter_SV_template.tex

Applications should be sent by EMAIL to jmelnick@eso.org no later than 29 May 2009.