ExoPlanet News
An Electronic Newsletter

No. 33, October 1st, 2010

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Contents

1 Editorial

Welcome to the thirty-third edition of ExoPlanet News. We are pleased to present another full newsletter this month, with plenty of abstracts and meeting announcements, as well as the usual selection of job adverts. Please continue to submit anything that you think is relevant to the field of exoplanet research and we'll try to find a place for it in a future edition of the newsletter. Remember that past editions of this newsletter, submission templates and other information can be found at the ExoPlanet News website: http://exoplanet.open.ac.uk.

Please send anything relevant to exoplanet@open.ac.uk, and it will appear in the next edition which we plan to send out at the beginning of November 2010.

Best wishes
Andrew Norton & Glenn White
The Open University

2 Abstracts of refereed papers

Two planets orbiting the recently formed post-common envelope binary NN Serpentis

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Astronomy & Astrophysics Letters, in press

Planets orbiting post-common envelope binaries provide fundamental information on planet formation and evolution. We have searched for such planets in NN Ser, an eclipsing short-period binary, which shows long-term eclipse time variations. Using published, re-analyzed, and new mid-eclipse times of NN Ser obtained between 1988 and 2010, we find excellent agreement with the light time effect produced by two additional bodies superposed on the linear ephemeris of the binary. Our multi-parameter fits accompanied by N-body simulations yield a best fit for the planets locked in the $2:1$ mean motion resonance, with orbital periods $P_b \simeq 15.5$ yrs and $P_c \simeq 7.7$ yrs, masses $M_b \sin i_b \simeq 6.9\,M_{Jup}$ and $M_c \sin i_c \simeq 2.2\,M_{Jup}$, and eccentricities $e_b \simeq 0$ and $e_c \simeq 0.20$. A secondary minimum of χ^2 corresponds to an alternative solution with a period ratio of $5:2$. We estimate that the progenitor binary consisted of an A star with $\sim 2\,M_\odot$ and the present M dwarf secondary at an orbital separation of ~ 1.5 AU. The survival of two planets through the common-envelope phase that created the present white dwarf requires fine tuning between the gravitational force and the drag force experienced by them in the expanding envelope. The alternative is a second generation origin in a circum-binary disk created at the end of this phase. In that case, the planets would be extremely young with an age not exceeding the cooling age of the white dwarf of 10^6 yrs.

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Deep near-infrared interferometric search for low-mass companions around β Pictoris

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Astronomy & Astrophysics, published (2010A&A...520L...2A)

Aims. We search for low-mass companions in the innermost region (< 300 mas, i.e., 6 AU) of the β Pic planetary system.
Methods. We obtained interferometric closure phase measurements in the K-band with the VLTI/AMBER instrument used in its medium spectral resolution mode. Fringe stabilization was provided by the FINITO fringe tracker.
Results. In a search region of between 2 and 60 mas in radius, our observations exclude at 3σ significance the presence of companions with K-band contrasts greater than 5×10^{-3} for 90% of the possible positions in the search zone (i.e., 90% completeness). The median 1σ error bar in the contrast of potential companions within our search region is 1.2×10^{-3}. The best fit to our data set using a binary model is found for a faint companion located at about 14.4 mas from β Pic, which has a contrast of $1.8 \times 10^{-3} \pm 1.1 \times 10^{-3}$ (a result consistent with the absence of companions). For angular separations larger than 60 mas, both time smearing and field-of-view limitations reduce the sensitivity.
Conclusion. We can exclude the presence of brown dwarfs with masses higher than $29\,M_{\rm Jup}$ (resp. $47\,M_{\rm Jup}$) at a 50% (resp. 90%) completeness level within the first few AUs around β Pic. Interferometric closure phases offer a promising way to directly image low-mass companions in the close environment of nearby young stars.

Download/Website: `http://adsabs.harvard.edu/abs/2010A&A...520L...2A`

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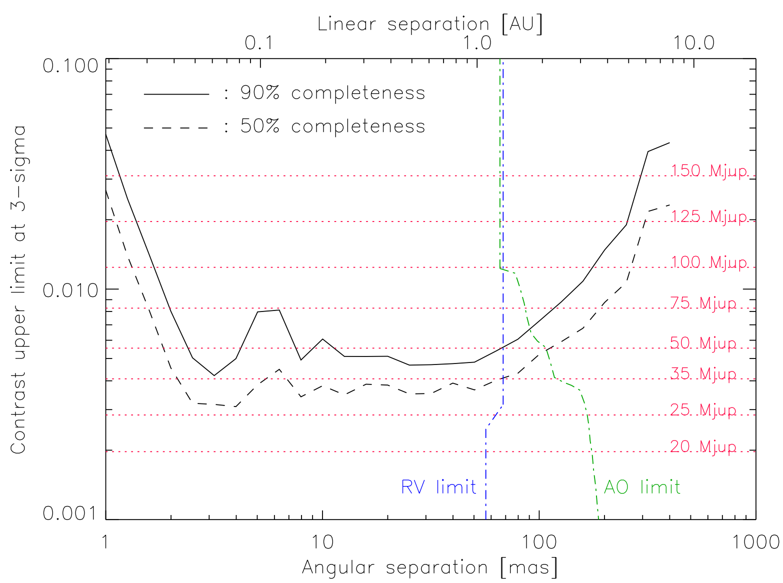

Figure 1: (Absil et al.) Sensitivity curves showing the 3σ upper limit to the contrast of off-axis companions as a function of the angular separation for 50% and 90% completeness, computed across annular fields-of-view with 10% relative width. Equivalent masses were computed using the COND model of Baraffe et al. (2003), for an age of 12 Myr. The companion discovery zones of radial velocity measurements (left of the blue dash-dotted line, Galland et al. 2006) and of AO-assisted coronagraphic imaging (right of the green dash-dotted line, Boccaletti et al. 2009) are shown for comparison.

Confirmation of a Retrograde Orbit for Exoplanet Wasp-17b

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Astrophysical Journal Letters, in press (arXiv:1009.5061)

We present high-precision radial velocity observations of WASP-17 throughout the transit of its close-in giant planet, using the MIKE spectrograph on the 6.5m Magellan Telescope at Las Campanas Observatory. By modeling the Rossiter-McLaughlin effect, we find the sky-projected spin-orbit angle to be $\lambda = 167.4 \pm 11.2$ deg. This independently confirms the previous finding that WASP-17b is on a retrograde orbit, suggesting it underwent migration via a mechanism other than just the gravitational interaction between the planet and the disk. Interestingly, our result for λ differs by 45 ± 13 deg from the previously announced value, and we also find that the spectroscopic transit occurs 15 ± 5 min earlier than expected, based on the published ephemeris. The discrepancy in the ephemeris highlights the need for contemporaneous spectroscopic and photometric transit observations whenever possible.

Download/Website: `http://arxiv.org/abs/1009.5061`

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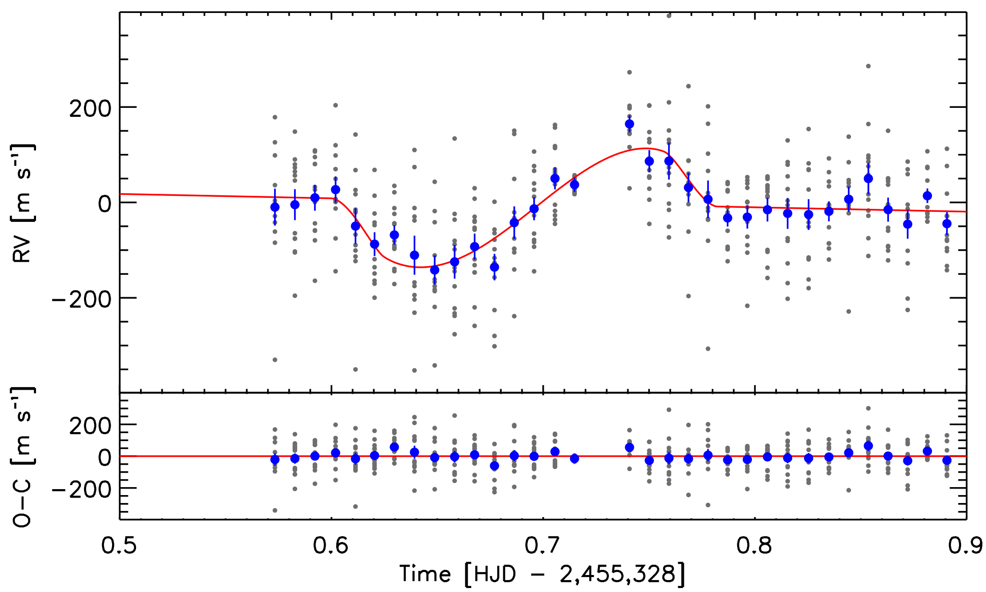

Figure 2: (Bayliss et al.) Spectroscopic transit of WASP-17b. Top: radial velocity variation observed on the night of 2010 May 11, along with the best-fitting model. The small gray points are the order-by-order radial velocities that were fitted. The larger blue points are averages of the results from all orders. Bottom: residuals between the data and the best-fitting model.

Dust size distributions in coagulation/fragmentation equilibrium: Numerical solutions and analytical fits

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Astronomy & Astrophysics, in press

Context. Grains in circumstellar disks are believed to grow by mutual collisions and subsequent sticking due to surface forces. Results of many fields of research involving circumstellar disks, such as radiative transfer calculations, disk chemistry, magneto-hydrodynamic simulations largely depend on the unknown grain size distribution.
Aims. As detailed calculations of grain growth and fragmentation are both numerically challenging and computationally expensive, we aim to find simple recipes and analytical solutions for the grain size distribution in circumstellar disks for a scenario in which grain growth is limited by fragmentation and radial drift can be neglected.
Methods. We generalize previous analytical work on self-similar steady-state grain distributions. Numerical simulations are carried out to identify under which conditions the grain size distributions can be understood in terms of a combination of power-law distributions. A physically motivated fitting formula for grain size distributions is derived using our analytical predictions and numerical simulations.
Results. We find good agreement between analytical results and numerical solutions of the Smoluchowski equation for simple shapes of the kernel function. The results for more complicated and realistic cases can be fitted with a physically motivated "black box" recipe presented in this paper. Our results show that the shape of the dust distribution is mostly dominated by the gas surface density (not the dust-to-gas ratio), the turbulence strength and the temperature and does not obey an MRN type distribution.

Download/Website: `http://dx.doi.org/10.1051/0004-6361/201015228`

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Planetary mass function and planetary systems

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Monthly Notices of the Royal Astronomical Society, accepted; arXiv.org:1009.4732

With planets orbiting stars, a planetary mass function should not be seen as a low-mass extension of the stellar mass function, but a proper formalism needs to take care of the fact that the statistical properties of planet populations are linked to the properties of their respective host stars. This can be accounted for by describing planet populations by means of a differential planetary mass-radius-orbit function, which together with the fraction of stars with given properties that are orbited by planets and the stellar mass function allows to derive all statistics for any considered sample. These fundamental functions provide a framework for comparing statistics that result from different observing techniques and campaigns which all have their very specific selection procedures and detection efficiencies. Moreover, recent results both from gravitational microlensing campaigns and radial-velocity surveys of stars indicate that planets tend to cluster in systems rather than being the lonely child of their respective parent star. While planetary multiplicity in an observed system becomes obvious with the detection of several planets, its quantitative assessment however comes with the challenge to exclude the presence of further planets. Current exoplanet samples begin to give us first hints at the population statistics, whereas pictures of planet parameter space in its full complexity call for samples that are 2–4 orders of magnitude larger. In order to derive meaningful statistics however, planet detection campaigns need to be designed in such a way that well-defined fully-deterministic target selection, monitoring, and detection criteria are applied. The probabilistic nature of gravitational microlensing makes this technique an illustrative example of all the encountered challenges and uncertainties.

Download/Website: `http://arxiv.org/abs/1009.4732`

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Sensitivity of Biomarkers to Changes in Chemical Emissions in the Earth's Proterozoic Atmosphere

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Icarus, published (arXiv-Code: 1009.0439)

The search for life beyond the Solar System is a major activity in exoplanet science. However, even if an Earth-like planet were to be found, it is unlikely to be at a similar stage of evolution as the modern Earth. It is therefore of interest to investigate the sensitivity of biomarker signals for life as we know it for an Earth-like planet but at earlier stages of evolution. Here, we assess biomarkers i.e. species almost exclusively associated with life, in present-day and in 10

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Transit timing variation and activity in the WASP-10 planetary system

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Monthly Notices of the Royal Astronomical Society, in press (arXiv/1009.4567)

Transit timing analysis may be an effective method of discovering additional bodies in extrasolar systems which harbour transiting exoplanets. The deviations from the Keplerian motion, caused by mutual gravitational interactions between planets, are expected to generate transit timing variations of transiting exoplanets. In 2009 we collected 9 light curves of 8 transits of the exoplanet WASP-10b. Combining these data with published ones, we found that transit timing cannot be explained by a constant period but by a periodic variation. Simplified three-body models which reproduce the observed variations of timing residuals were identified by numerical simulations. We found that the configuration with an additional planet of mass of $\sim$0.1 $M_{\rm J}$ and orbital period of $\sim$5.23 d, located close to the outer 5:3 mean motion resonance, is the most likely scenario. If the second planet is a transiter, the estimated flux drop will be $\sim$0.3 per cent and can be observable with a ground-based telescope. Moreover, we present evidence that the spots on the stellar surface and rotation of the star affect the radial velocity curve giving rise to spurious eccentricity of the orbit of the first planet. We argue that the orbit of WASP-10b is essentially circular. Using the gyrochronology method, the host star was found to be 270 ± 80 Myr old. This young age can explain the large radius reported for WASP-10b.

Download/Website: http://arxiv.org/abs/1009.4567

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Two-Dimensional Study of the Propagation of Planetary Wake and the Indication to Gap Opening in an Inviscid Protoplanetary Disk

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Astrophysical Journal, Accepted(arXiv:1009.4963)

We analyze the physical processes of gap formation in an inviscid protoplanetary disk with an embedded protoplanet using two-dimensional local shearing-sheet model. Spiral density wave launched by the planet shocks and the angular momentum carried by the wave is transferred to the background flow. The exchange of the angular momentum can affect the mass flux in the vicinity of the planet to form an underdense region, or gap, around the planetary orbit. We first perform weakly non-linear analyses to show that the specific vorticity formed by shock dissipation of density wave can be a source of mass flux in the vicinity of the planet, and that the gap can be opened even for low-mass planets unless the migration of the planet is substantial. We then perform high resolution numerical simulations to check analytic consideration. By comparing the gap opening timescale and type I migration timescale, we propose a criterion for the formation of underdense region around the planetary orbit that is qualitatively different from previous studies. The minimum mass required for the planet to form a dip is twice as small as previous studies if we incorporate the standard values of type I migration timescale, but it can be much smaller if there is a location in the disk where type I migration is halted.

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WASP-37b: a 1.8 M_J exoplanet transiting a metal-poor star

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Astronomical Journal, accepted (2010arXiv1008.3096S)

We report on the discovery of WASP-37b, a transiting hot Jupiter orbiting a $m_{\rm v}$ = 12.7 G2-type dwarf, with a period of 3.577469 $\pm$ 0.000011 d, transit epoch T_0 = 2455338.6188 $\pm$ 0.0006 (HJD), and a transit duration $0.1304^{+0.0018}_{-0.0017}$ d. The planetary companion has a mass $M_{\rm p}$ = 1.80 $\pm$ 0.17 M_J and radius $R_{\rm p}$ = $1.16^{+0.07}_{-0.06}$ R_J, yielding a mean density of $1.15^{+0.12}_{-0.15}$ ρ_J. From a spectral analysis, we find the host star has M_* = 0.925 $\pm$ 0.120 $M_\odot$, R_* = 1.003 $\pm$ 0.053 $R_\odot$, $T_{\rm eff}$ = 5800 $\pm$ 150 K and [Fe/H] = -0.40 ± 0.12. WASP-37 is therefore one of the lowest metallicity stars to host a transiting planet.

Download/Website: http://arxiv.org/abs/1008.3096

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Independent discovery and refined parameters of the transiting exoplanet HAT-P-14b

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Astronomical Journal, submitted (arXiv:1009.3470)

We present SuperWASP observations of HAT-P-14b, a hot Jupiter discovered by Torres et al. The planet was found independently by the SuperWASP team and named WASP-27b after follow-up observations had secured the discovery, but prior to the publication by Torres et al. Our analysis of HAT-P-14/WASP-27 is in good agreement with the values found by Torres et al. and we refine the parameters by combining our datasets. We also provide additional evidence against astronomical false positives. Due to the brightness of the host star, V = 10, HAT-P-14 is an attractive candidate for further characterisation observations. The planet has a high impact parameter, $b = 0.907 \pm 0.004$, and the primary transit is close to grazing. This could readily reveal small deviations in the orbital parameters indicating the presence of a third body in the system, which may be causing the small but significant orbital eccentricity, $e = 0.095 \pm 0.011$. The system geometry suggests that the planet narrowly fails to undergo a secondary eclipse. However, even a non-detection would tightly constrain the system parameters.

Download/Website: http://arxiv.org/abs/1009.3470

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HAT-P-13: a multi-site campaign to detect the transit of the second planet in the system

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Astronomy & Astrophysics, in press

HAT-P-13b is a 0.85 M_J hot Jupiter on a 2.9 day orbit that has almost been circularized. HAT-P-13c has a minimum mass of $M\sin i$=15.2 M_J in a 428 day orbit with 0.69 eccentricity. Winn et al. (2010, ApJ, 718, 575) predicted a possible transit for the second planet, which, if confirmed, would make HAT-P-13 an extremely special system. A possible transit of HAT-P-13c has been predicted to occur on 2010 April 28. Here we report on the results of a multi-site campaign that has been organised to detect the event.

CCD photometric observations have been carried out at five observatories in five countries (Taiwan, Malaysia, Hungary, Italy, USA). We reached 30% time coverage in a 5 days interval centered on the suspected transit of HAT-P-13c. Two transits of HAT-P-13b were also observed.

No transit of HAT-P-13c has been detected while the campaign was on. We did a numerical experiment to determine the quantitative measure of the significance. A set of 10^5 exoplanets were simulated on a similar orbit to HAT-P-13 (428 days period around an 1.22 $R_\odot$, 1.56 $R_\odot$ star). Model transit light curves were sampled at the times of observation points. We added bootstrap noise to the individual points. Then a χ^2 test was applied to check if the simulations are inconsistent with zero at the 99% significance level.

We conclude that HAT-P-13c is not a transiting exoplanet with a significance level from 65% to 72%, depending on the planet parameters and the prior assumptions.

We determined new transit times of HAT-P-13b as: BJD 2455141.5522$\pm$0.001 and 2455249.4508$\pm$0.002. Seven transit times were published by Bakos et al. (2009, ApJ, 707, 446) which were included in the TTV analysis. Combining all data, we refined the period of HAT-P-13b to be 2.916293$\pm$0.000010 days, while the determined TTV diagram is plotted in Fig. 3. All points are consistent with zero within the error bars.

The refined orbital period of HAT-P-13b is 2.916293$\pm$0.000010 days.

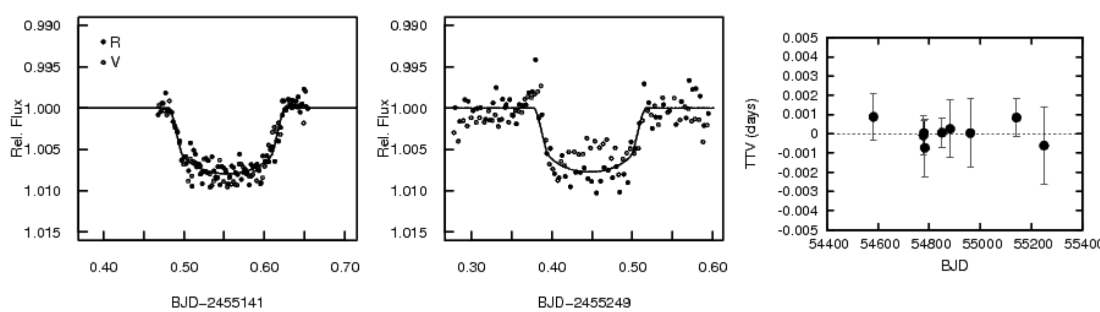

Figure 3: (Szabo et al.) Model fit to the transit on November 05/06, 2009 (left panel) and February 21/22, 2010 (middle panel). V and R band data are plotted with open and soli d dots, respectively. Right panel: Transit Timing Variation of HAT-P-13b.

Spin-orbit angle measurements for six southern transiting planets: New insights into the dynamical origins of hot Jupiters

Amaury H.M.J. Triaud[1], *Andrew Collier Cameron*[2], *Didier Queloz*[1], *David R. Anderson*[3], *Michaël Gillon*[4], *Leslie Hebb*[5], *Coel Hellier*[3], *Benoît Loeillet*[6], *Pierre F. L. Maxted*[3], *Michel Mayor*[1], *Francesco Pepe*[1], *Don Pollacco*[7], *Damien Ségransan*[1], *Barry Smalley*[3], *Stéphane Udry*[1], *Richard G. West*[8], *Peter J. Wheatley*[9]

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[5] Department of Physics and Astronomy, Vanderbilt University, Nashville, TN37235, USA
[6] Laboratoire d'Astrophysique de Marseille, BP 8, 13376 Marseille Cedex 12, France
[7] Astrophysics Research Centre, School of Mathematics & Physics, Queens University, University Road, Belfast BT71NN, UK
[8] Department of Physics and Astronomy, University of Leicester, Leicester LE17RH, UK
[9] Department of Physics, University of Warwick, Coventry CV4 7AL, UK

A&A, in press (arXiv:1008.2353v1)

Several competing scenarios for planetary-system formation and evolution seek to explain how hot Jupiters came to be so close to their parent stars. Most planetary parameters evolve with time, making it hard to distinguish between models. The obliquity of an orbit with respect to the stellar rotation axis is thought to be more stable than other parameters such as eccentricity. Most planets, to date, appear aligned with the stellar rotation axis; the few misaligned planets so far detected are massive ($> 2\,M_{\rm J}$).

Our goal is to measure the degree of alignment between planetary orbits and stellar spin axes, to search for potential correlations with eccentricity or other planetary parameters and to measure long term radial velocity variability indicating the presence of other bodies in the system.

For transiting planets, the Rossiter-McLaughlin effect allows the measurement of the sky-projected angle β between the stellar rotation axis and a planet's orbital axis. Using the HARPS spectrograph, we observed the Rossiter-McLaughlin effect for six transiting hot Jupiters found by the WASP consortium. We combine these with long term radial velocity measurements obtained with CORALIE. We used a combined analysis of photometry and radial velocities, fitting model parameters with the Markov Chain Monte Carlo method. After obtaining β we attempt to statistically determine the distribution of the real spin-orbit angle ψ.

We found that three of our targets have β above $90°$: WASP-2b: $\beta = 153°\,^{+11}_{-15}$, WASP-15b: $\beta = 139.6°\,^{+5.2}_{-4.3}$ and WASP-17b: $\beta = 148.5°\,^{+5.1}_{-4.2}$; the other three (WASP-4b, WASP-5b and WASP-18b) have angles compatible with $0°$. We find no dependence between the misaligned angle and planet mass nor with any other planetary parameter. All six orbits are close to circular, with only one firm detection of eccentricity $e = 0.00848^{+0.00085}_{-0.00095}$ in WASP-18b. No long-term radial acceleration was detected for any of the targets. Combining all previous 20 measurements of β and our six and transforming them into a distribution of ψ we find that between about 45 and $85\,\%$ of hot Jupiters have $\psi > 30°$.

Most hot Jupiters are misaligned, with a large variety of spin-orbit angles. We find observations and predictions using the Kozai mechanism match well. If these observational facts are confirmed in the future, we may then conclude that most hot Jupiters are formed from a dynamical and tidal origin without the necessity to use type I or II migration. At present, standard disc migration cannot explain the observations without invoking at least another additional process.

Download/Website: `http://arxiv.org/abs/1008.2353`

Contact: `amaury.triaud@unige.ch`

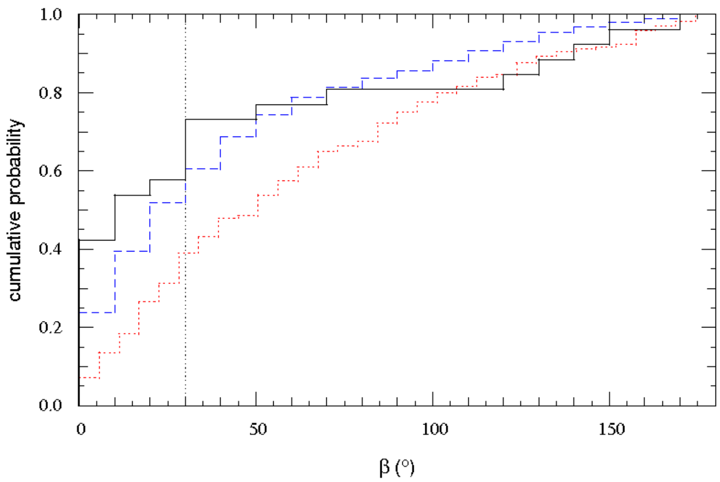

Figure 4: (Triaud et al.) Cumulative probability function for models by Fabrycky & Tremaine (2007) (Kozai mechanism & tidal friction) (blued dashed) and Nagasawa et al (2008) (planet-planet scattering + Kozai mechanism + tidal friction) (red dotted) converted from the theoretical stellar spin to orbit spin angle ψ to the observed projected spin-orbit angle β, compared with current observations of β (plain black). If standard disc migration alone was at work, one would expect the observations to not go beyond the vertical black dotted line at $\beta = 30°$ below which it is hard to detect significantly a misalignement. Above that, planets are considered misaligned.

3 Other abstracts

The Astrophysical Environment of the Solar Birthplace

J. P. Williams
Institute for Astronomy, University of Hawaii, Honolulu, USA

Contemporary Physics, published (v51, p381)

Our Sun, like all stars, formed within a cold molecular cloud. Astronomical observations and theory provide considerable detail into this process. Yet cosmochemical observations of short lived radionuclides in primitive meteorites, in particular ^{60}Fe, provide unequivocal evidence that the early solar system inherited fresh nucleosynthetic material from the core of a hot, massive star, almost certainly ejected in a supernova explosion. I give a short introduction to the fields of star formation and meteoritics and discuss how the reconciliation of their disparate clues to our origin places strong constraints on the environment of the Solar birthplace. Direct injection of supernova ejecta into a protoplanetary disk or a dense molecular core is unlikely since their small sizes require placement unusually close to the massive star. Lower density molecular cloud clumps can capture more ejecta but the radionuclides decay during the slow gravitational collapse. The most likely scenario is on the largest scales via the formation of enriched molecular clouds at the intersection of colliding supernova bubbles in spiral arms.
[This is an introductory review intended for advanced undergraduate or beginning graduate students.]

Download/Website: `http://arxiv.org/abs/1008.2973`

Contact: `jpw@ifa.hawaii.edu`

4 Abstracts of theses

Transiting exoplanets: characterisation in the presence of stellar activity

A. Alapini
University of Exeter, Stocker Road, Exeter EX4 4QL, UK

Doctoral theses, University of Exeter, UK, March 2010

The combined observations of a planets transits and the radial velocity variations of its host star allow the determination of the planets orbital parameters, and most interestingly of its radius and mass, and hence its mean density. Observed densities provide important constraints to planet structure and evolution models. The uncertainties on the parameters of large exoplanets mainly arise from those on stellar masses and radii. For small exoplanets, the treatment of stellar variability limits the accuracy on the de- rived parameters. The goal of this PhD thesis was to reduce these sources of uncertainty by developing new techniques for stellar variability filtering and for the determination of stellar temperatures, and by robustly fitting the transits taking into account external constraints on the planets host star. To this end, I developed the Iterative Reconstruction Filter (IRF), a new post-detection stellar variability filter. By exploiting the prior knowledge of the planets orbital period, it simultaneously estimates the transit signal and the stellar variability signal, using a combination of moving average and median filters. The IRF was tested on simulated CoRoT light curves, where it significantly improved the estimate of the transit signal, particularly in the case of light curves with strong stellar variability. It was then applied to the light curves of the first seven planets discovered by CoRoT, a space mission designed to search for planetary transits, to obtain refined estimates of their parameters. As the IRF preserves all signal at the planets orbital period, it can also be used to search for secondary eclipses and orbital phase variations for the most promising cases. This enabled the detection of the secondary eclipses of CoRoT-1b and CoRoT-2b in the white (300–1000 nm) CoRoT bandpass, as well as a marginal detection of CoRoT-1b's orbital phase variations. The wide optical bandpass of CoRoT limits the distinction between thermal emission and reflected light contributions to the secondary eclipse. I developed a method to derive precise stellar relative temperatures using equivalent width ratios and applied it to the host stars of the first eight CoRoT planets. For stars with temperature within the calibrated range, the derived temperatures are consistent with the literature, but have smaller formal uncertainties. I then used a Markov Chain Monte Carlo technique to explore the correlations between planet parameters derived from transits, and the impact of external constraints (e.g. the spectroscopically derived stellar temperature, which is linked to the stellar density). Globally, this PhD thesis highlights, and in part addresses, the complexity of performing detailed characterisation of transit light curves. Many low amplitude effects must be taken into account: residual stellar activity and systematics, stellar limb darkening, and the interplay of all available constraints on transit fitting. Several promising areas for further improvements and applications were identified. Current and future high precision photometry missions will discover increasing numbers of small planets around relatively active stars, and the IRF is expected to be useful in characterising them.

Download/Website: `http://hdl.handle.net/10036/104834`

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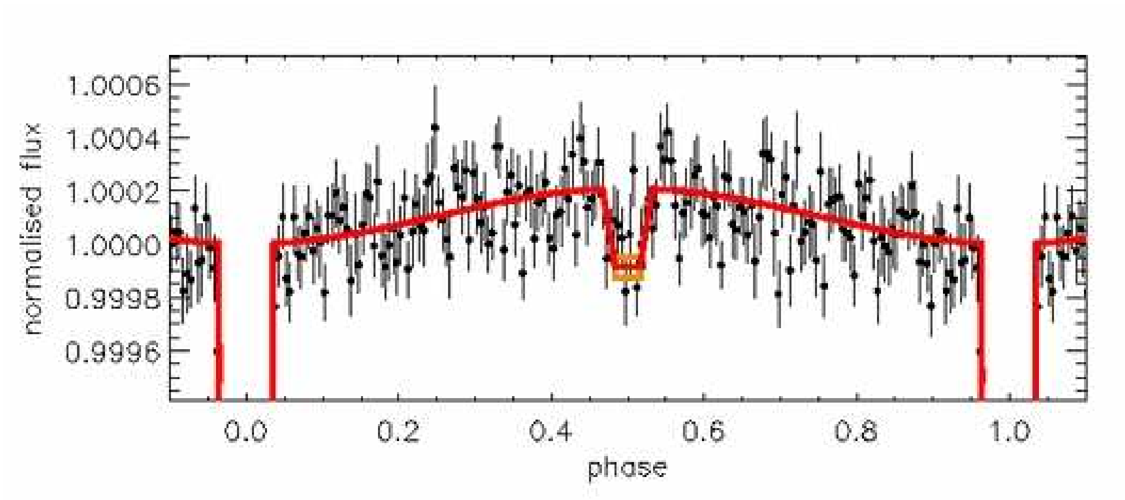

Figure 5: (Alapini) The binned phase-folded IRF-filtered optical transit light curve of the planet CoRoT-1b, taken with CoRoT, centred on the secondary eclipse, with the planet photometric orbit in red. The photometric orbit contains a models of the primary transit, a model of the secondary eclipse (the uncertainty on the secondary eclipse depth is marked in orange) and a model of the planet orbital phase variations. The model of the secondary eclipse is a trapeze at phase 0.5 with a total duration of 0.066 phase units, an internal duration (planet fully eclipsed) with the same duration ratio as the transit, and a depth of (2.9±0.8) 10^{-4}. The model of the orbital phase variation is a sinusoid with an amplitude of 2.1x10^{-4}, a period fixed to the planet orbital period and a phase at maximum amplitude fixed to the phase of the secondary eclipse.

5 Conference announcements

NASA's Exoplanet Exploration Program Analysis Group

Jim Kasting

NASA's Exoplanet Exploration Program Analysis Group (ExoPAG) will hold a 2-day meeting on January 8-9, 2011, just prior to the AAS annual meeting in Seattle. The meeting will be held at the same venue as the AAS meeting itself. Topics of discussion will include reports from the 5 existing Study Analysis Groups, along with new plans for how the exoplanet research community can respond to the recently released Astro2010 Survey.

Download/Website: `http://exep.jpl.nasa.gov/exopag/`

Contact: `jfk4@psu.edu`

PLATO-UK Science Meeting

Don Pollacco
Queens University Belfast

Royal Astronomical Society, Burlington House, Piccadilly, London, 3rd-4th November 2010

PLATO is a proposed ESA mission to carry out asteroseismology and detect planetary transits of Earth-like exoplanets, from space. The PLATO UK consortium is planning a science meeting on Wednesday 3rd / Thursday 4th November to be held in the RAS Lecture Theatre, London. The meeting is open to all who are interested in PLATO science and who wish to find out how they might become involved in the mission.

Planned sessions include:
Wednesday a.m.: The PLATO mission and PLATO UK
Wednesday p.m.: Extrasolar planet science
Thursday a.m.: Asteroseismology
Thursday p.m.: Additional science & How to get involved

There is no meeting fee. If you wish to attend, please let Andrew Norton know (A.J.Norton@open.ac.uk) with the following information by Friday 22nd October:

Name (for badge):
Institute:
Preferred e-mail:
Attendance: (for catering purposes)
Weds a.m. / Weds lunch / Weds p.m. / Thurs a.m. / Thurs lunch / Thurs p.m.

Contact: `a.j.norton@open.ac.uk`

PLATO Mission Consortium Meeting

Claude Catala
Observatoire de Paris

CNES Headquarters, 2 place Maurice Quentin, Paris, 9th-10th November 2010

A kick-off meeting of the PLATO Mission Consortium (PMC) will be held in Paris on Nov. 9 and 10, 2010.

PLATO (PLAnetary Transits and Oscillations of stars) is a candidate M-class mission of the ESA Cosmic Vision program. Its main objective is to perform ultra-high precision photometric monitoring of large samples of bright stars, in order to detect and characterize a large number of exoplanets of all sizes and masses, as well as their host stars. The PLATO Mission Consortium was constituted in response to an Announcement of Opportunity by ESA. It will perform a Definition Study phase of the whole mission until December 2011. A down-selection will occur at mid-term of this definition study, in June 2011, when the final selection of the Cosmic Vision M2 mission will be made.

This meeting will be the first opportunity for members of the PLATO Mission Consortium (PMC) to meet all together. It will be organized around a full day plenary session, during which all aspects of the PMC work will be presented and discussed: Payload, Data Centre, Science Preparation, followed by three splinter sessions on the second day, one on each of the main activity branches of the PMC.

Please check the webpage for more information. The deadline for registration is Oct. 16, 2010.

Download/Website: `http://dev-lesia.obspm.fr/PLATO/kickoff/`

Contact: `Claude.Catala@obspm.fr`

41^{st} Saas-Fee Advanced Course on Astrobiology: From Planets to Life

Pierre Dubath, Stéphane Paltani, Stéphane Udry, Amaury Triaud with Michel Mayor & André Maeder
Observatoire Astronomique de l'Université de Genève, Chemin des Maillettes 51, CH-1290 Sauverny, Switzerland

Organised by the Swiss Society of Astronomy & Astrophysics with support from the Swiss Academy of Natural Sciences, 3^{rd} to 9^{th} April 2011

The course covers the most important and critical events essential for the emergence and development of intelligent life on Earth. Are these events inevitable or are they fortuitous and unlikely to reproduce elsewhere under similar conditions. The underlying and fascinating question is the ubiquity of life in our Universe: are we alone? Have complex life forms developed on extrasolar planets? Three lecturers will present the subject from different view points in the course of 28 lectures of 50 minutes:

- Astrophysical conditions for development of life,
  by Prof. Jonathan Lunine (University of Arizona)
- Earth geology and climatology history,
  by Prof. James Kasting (Pennsylvania State University)
- Origin and critical steps of life development on Earth,
  by Prof. John Baross (University of Washington)

The lectures will be held in the morning and in the late afternoon leaving free time for informal discussions, studies and outdoor activities (e.g., skiing) in the afternoons. It is an excellent opportunity for PhD students to catch up with current research and for more senior scientists to broaden their knowledge in the domain. The lectures will then be gathered and printed into a textbook published by Springer-Verlag in the Saas-Fee series.
Please note that attendance is limited to 100 participants. Registration may close earlier if this number is reached (registration will be considered in the fee payment reception order).

Download/Website: `http://www.isdc.unige.ch/sf2011/`

Contact: `saas-fee@unige.ch`

6 Jobs and Positions

CoRoT Postdoctoral Position

Artie Hatzes
Thüringer Landessternwarte, Germany

Tautenburg, Germany, After 1 Nov 2010

A Postdoctoral position in the Extrasolar Planet group at the Thringer Landessternwarte Tautenburg is available to work on the CoRoT Space Mission. This position is for 2 years with a possible extension for a third year depending on funding. The CoRoT Space Mission. CoRoT (Convection, Rotation, and planetary Transits) is a small satellite with a 27cm telescope that obtains ultra-precise photometric measurements of thousands of stars. The mission has two goals: searching for extrasolar planets with the transit method and asteroseismic studies of bright stars. CoRoT was successfully launched on 27 December 2006.

The successful applicant will focus on obtaining and analyzing ground-based follow-up observations of CoRoT targets. These will be used to confirm the nature of transit candidates as well as to derive important properties of CoRoT stars. Both spectroscopic and photometric observations will be made using the Tautenburg 2m telescope as well as other facilities throughout the world. Although there is a preference for applicants with experience in the spectral analysis of stars, applicants with experience in the analysis of light curves will also be considered

Candidates should have:

- A Doctorate in Physics, Astronomy, or Astrophysics
- Observational experience in stellar spectroscopy
- Experience in the analysis of stellar spectra and deriving stellar parameters and or experience in the analysis of photometric data
- Experience in dealing with large databases An interest in the analysis and scientific exploitation of CoRoT light curves.

Applicants having the qualities of creativity, initiative, and independence are strongly desirable.

To apply please send: 1) An application letter, 2) Curriculum Vitae and a brief description of your research interests and scientific interest in CoRoT and 3) The names of three professionals who can be contacted for letters of reference Applications will be accepted until a suitable candidate is found. All applications received before 15 Oct 2010 will be given full consideration.

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Phone: +49 (0) 36427-863-51, 36427-863-55

Download/Website: `http://www.tls-tautenburg.de`

Contact: `artie@tls-tautenburg.de`

Sagan Exoplanet Postdoctoral Fellowships

Dr. Dawn M. Gelino

Pasadena, CA, Due: November 4, 2010; Start Date: Fall 2011

We are now accepting applications for the 2011 Sagan Exoplanet Postdoctoral Fellowships! Applications are due Thursday, November 4 at 4 PM PDT.

On behalf of the NASA Astrophysics Division, the NASA Exoplanet Science Institute (NExScI) is pleased to announce the 2011 Sagan Postdoctoral Fellowship Program and solicits applications for fellowships to begin in the Fall of 2011. The Sagan Fellowships support outstanding recent postdoctoral scientists to conduct independent research that is broadly related to the science goals of the NASA Exoplanet Exploration area. The primary goal of missions within this program is to discover and characterize planetary systems and Earth-like planets around nearby stars.

The proposed research may be theoretical, observational, or instrumental. This program is open to applicants of any nationality who have earned (or will have earned) their doctoral degrees between January 1, 2008 and September 1, 2011, in astronomy, physics, or related disciplines. The fellowships are tenable at U.S. host institutions of the fellows' choice, subject to a maximum of one new fellow per host institution per year. The duration of the fellowship is up to three years: an initial one-year appointment and two annual renewals contingent on satisfactory performance and availability of NASA funding.

The Announcement of Opportunity, which includes detailed program policies and application instructions, is available on-line at: http://nexsci.caltech.edu/sagan/fellowship.shtml . Applicants must follow all instructions given in this Announcement including those for submitting applications through the web. Inquiries about the Sagan Fellowships may be directed to saganfellowship@ipac.caltech.edu.

The deadline for all required materials, including applications and letters of reference, is Thursday, November 4, 2010 (4:00 PM PDT). We anticipate awarding 6 fellowships in 2011. Offers are expected to be made before February 1, 2011, and new Sagan Fellow appointments are expected to begin on or about September 1, 2011.

Download/Website: `http://nexsci.caltech.edu/sagan/fellowship.shtml`

Contact: `saganfellowship@ipac.caltech.edu`

7 As seen on astro-ph

The following list contains all the entries relating to exoplanets that we spotted on astro-ph during September 2010. If you spot any that we missed, please let us know and we'll include them in the next issue. And of course, the best way to ensure we include your paper is to send us the abstract.

Exoplanets

astro-ph/1009.0071: **Near-infrared Thermal Emission from WASP-12b: detections of the secondary eclipse in Ks, H & J** by *Bryce Croll, David Lafreniere, Loic Albert et al.*

astro-ph/1009.0439: **Sensitivity of Biomarkers to Changes in Chemical Emissions in the Earth's Proterozoic Atmosphere** by *John Lee Grenfell, Stefanie Gebauer, Philip von Paris et al.*

astro-ph/1009.0538: **First Results From VLT NACO Apodizing Phase Plate: 4-micron Images of the Exoplanet beta Pictoris b** by *Sascha P. Quanz, Michael R. Meyer, Matthew Kenworthy et al.*

astro-ph/1009.1352: **Tidal Evolution of Exoplanets** by *Alexandre C. M. Correia, Jacques Laskar*

astro-ph/1009.1355: **Detecting Volcanism on Extrasolar Planets** by *L. Kaltenegger, W. G. Henning, D. D. Sasselov*

astro-ph/1009.1399: **Too Little, Too Late: How the Tidal Evolution of Hot Jupiters affects Transit Surveys of Clusters** by *John H. Debes, Brian Jackson*

astro-ph/1009.1738: **Keplerian Orbits and Dynamics** by *Carl D. Murray, Alexandre C. M. Correia*

astro-ph/1009.1760: **First life in primordial-planet oceans: the biological big bang** by *Carl H. Gibson, N. Chandra Wickramasinghe, Rudolph E. Schild*

astro-ph/1009.1873: **SOPHIE velocimetry of Kepler transit candidates. I. Detection of the low-mass white dwarf KOI-74b** by *David Ehrenreich, Anne-Marie Lagrange, Francois Bouchy et al.*

astro-ph/1009.2130: **Lithium Abundances in a Sample of Planet Hosting Dwarfs** by *L. Ghezzi, K. Cunha, V. V. Smith et al.*

astro-ph/1009.2212: **A Scientometric Prediction of the Discovery of the First Potentially Habitable Planet with a Mass Similar to Earth** by *Samuel Arbesman, Gregory Laughlin*

astro-ph/1009.2383: **Predicting the incidence of planets and debris discs as a function of stellar mass** by *J.S. Greaves*

astro-ph/1009.2597: **Transiting exoplanets from the CoRoT space mission XIV. CoRoT-11b: a transiting massive "hot-Jupiter" in a prograde orbit around a rapidly rotating F-type star** by *D. Gandolfi, G. Hebrard, R. Alonso et al.*

astro-ph/1009.3013: **Ensemble analysis of open cluster transit surveys: upper limits on the frequency of short-period planets consistent with the field** by *Jennifer L. van Saders, B. Scott Gaudi*

astro-ph/1009.3027: **Calibration of Equilibrium Tide Theory for Extrasolar Planet Systems** by *Brad Hansen*
astro-ph/1009.3048: **Discovery of eclipsing white dwarf systems in a search for Earth-size companions** by *A.J. Drake, E. Beshore, M. Catelan et al.*
astro-ph/1009.3071: **Exoplanet al.bedo spectra and colors as a function of planet phase, separation, and metallicity** by *Kerri L. Cahoy, Mark S. Marley, Jonathan J. Fortney*
astro-ph/1009.3273: **Ohmic Dissipation in the Atmospheres of Hot Jupiters** by *Rosalba Perna, Kristen Menou, Emily Rauscher*
astro-ph/1009.3470: **Independent discovery and refined parameters of the transiting exoplanet HAT-P-14b** by *E. K. Simpson, S. C. C. Barros, D. J. A. Brown et al.*
astro-ph/1009.3495: **Destruction of Binary Minor Planets During Neptune Scattering** by *Alex H. Parker, JJ Kavelaars*
astro-ph/1009.3598: **HAT-P-13: a multi-site campaign to detect the transit of the second planet in the system** by *Gy. M. Szabo, L. L. Kiss, J. M. Benko et al.*
astro-ph/1009.4099: **Stellar activity, differential rotation, and exoplanets** by *A. F. Lanza*
astro-ph/1009.4196: **The effects of fly-bys on planetary systems** by *Daniel Malmberg, Melvyn B. Davies, Douglas C. Heggie*
astro-ph/1009.4567: **Transit timing variation and activity in the WASP-10 planetary system** by *G.Maciejewski, D.Dimitrov, R.Neuhaeuser et al.*
astro-ph/1009.4732: **Planetary mass function and planetary systems** by *M. Dominik*
astro-ph/1009.4931: **Photometric Phase Variations of Long-Period Eccentric Planets** by *Stephen R. Kane, Dawn M. Gelino*
astro-ph/1009.5061: **Confirmation of a Retrograde Orbit for Exoplanet WASP-17** by *Daniel D. R. Bayliss, Joshua N. Winn, Rosemary A. Mardling et al.*
astro-ph/1009.5224: **Chemical Clues on the Formation of Planetary Systems: C/O vs Mg/Si for HARPS GTO Sample** by *Elisa Delgado Mena, Garik Israelian, Jonay I. Gonzalez-Hernandez et al.*
astro-ph/1009.5306: **The first WASP public data release** by *O. W. Butters, R. G. West, D. R. Anderson et al.*
astro-ph/1009.5318: **WASP-29b: A Saturn-sized transiting exoplanet** by *Coel Hellier, D.R. Anderson, A. Collier Cameron et al.*
astro-ph/1009.5399: **Discovery of a 1.6-year Magnetic Activity Cycle in the Exoplanet Host Star iota Horologii** by *T.S. Metcalfe, S. Basu, T.J. Henry et al.*
astro-ph/1009.5500: **Constraints on the exosphere of CoRoT-7b** by *E.W. Guenther, J. Cabrera, A. Erikson, M. Fridlund et al.*
astro-ph/1009.5507: **Pair-correlation analysis of HD 10180 reveals a possible planetary orbit at about 0.92 AU** by *Kasper Olsen, Jakob Bohr*
astro-ph/1009.5665: **A frozen super-Earth orbiting a star at the bottom of the Main Sequence** by *D. Kubas, J. P. Beaulieu, D.P. Bennett et al.*
astro-ph/1009.5671: **The Oblique Orbit of the Super-Neptune HAT-P-11b** by *Joshua N. Winn, John Asher Johnson, Andrew W. Howard et al.*
astro-ph/1009.5677: **A Possible Tilted Orbit of the Super-Neptune HAT-P-11** by *Teruyuki Hirano, Norio Narita, Avi Shporer et al.*
astro-ph/1009.5733: **The Lick-Carnegie Exoplanet Survey: A 3.1 M_{Earth} Planet in the Habitable Zone of the Nearby M3V Star Gliese 581** by *Steven S. Vogt, R. Paul Butler, Eugenio J. Rivera et al.*
astro-ph/1009.5769: **Measurements of Transit Timing Variations for WASP-5b** by *Akihiko Fukui, Norio Narita, Paul J. Tristram et al.*
astro-ph/1009.5814: **The extrasolar planet GL 581 d: A potentially habitable planet?** by *P. von Paris, S. Gebauer, M. Go et al.*
astro-ph/1009.5851: **Planetary systems in close binary stars: the case of HD196885** by *G. Chauvin, H. Beust, A.-M. Lagra et al.*
astro-ph/1009.5917: **WASP-25b: a 0.6 M_J planet in the Southern hemisphere** by *B.Enoch, A.Collier Cameron,*

D.R.Anderson et al.

astro-ph/1009.5947: **Early UV Ingress in WASP-12b: Measuring Planetary Magnetic Fields** by *A. A. Vidotto, M. Jardine, Ch. Helling*

astro-ph/1009.5955: **The Impact of Hot Jupiters on the Spin-down of their Host Stars** by *O. Cohen, J.J Drake, V.L. Kashyap et al.*

Disks

astro-ph/1009.0248: **Forming the first planetary systems: debris around Galactic thick disc stars** by *C. K. W. Sheehan, J. S. Greaves, G. Bryden et al.*

astro-ph/1009.0480: **Evolution of the Solar Nebula and Planet Growth Under the Influence of Photoevaporation** by *Tyler R. Mitchell, Glen R. Stewart*

astro-ph/1009.1913: **Saturated torque formula for planetary migration in viscous disks with thermal diffusion: recipe for protoplanet population synthesis** by *Frederic S. Masset, Jules Casoli*

astro-ph/1009.2073: **Embedded protostellar disks around (sub-)solar protostars. I. Disk structure and evolution** by *Eduard I. Vorobyov*

astro-ph/1009.3233: **Evolution of Spin Direction of Accreting Magnetic Protostars and Spin-Orbit Misalignment in Exoplanetary Systems: II. Warped Discs** by *Francois Foucart, Dong Lai*

astro-ph/1009.4148: **3D Disk-Planet Torques in a Locally Isothermal Disk** by *Gennaro D'Angelo, Stephen H. Lubow*

astro-ph/1009.4221: **Observing the Luminosity Increase and Roche Lobe Overflow of Planet Destruction** by *Stuart F. Taylor*

astro-ph/1009.4525: **Planetesimal-driven planet migration in the presence of a gas disk** by *Christopher C. Capobianco, Martin Duncan, Harold F. Levison*

astro-ph/1009.4636: **From Dust To Planetesimal: The Snowball Phase ?** by *Ji-Wei Xie, Matthew J. Payne, Philippe Thebault et al.*

astro-ph/1009.4963: **Two-Dimensional Study of the Propagation of Planetary Wake and the Indication to Gap Opening in an Inviscid Protoplanetary Disk** by *Takayuki Muto, Takeru K. Suzuki, Shu-ichiro Inutsuka*

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