ExoPlanet News
An Electronic Newsletter

No. 44, November 1st, 2011

Editors: Andrew J. Norton
Glenn J. White
Dept. of Physics & Astronomy, The Open University, Milton Keynes MK7 6AA, UK
exoplanet@open.ac.uk, http://exoplanet.open.ac.uk/

Contents

1 Editorial

Welcome to the forty-fourth edition of ExoPlanet News.

Here we have another large selection of exoplanet-related abstracts, covering a wide range of science topics. Along with the usual selection of job opportunities and conference/meeting announcements, we hope that this month's newsletter provides useful and informative reading over the coming weeks. The distribution list now contains well over 1000 subscribers, so if you want your exoplanet science to reach the largest audience, please consider sending in your abstracts or other announcements to appear in future issues.
The next edition of the newsletter is planned for the beginning of December 2011, so please send anything relevant to exoplanet@open.ac.uk, and it will appear then. 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.

Best wishes
Andrew Norton & Glenn White
The Open University

2 Abstracts of refereed papers

A simple method to estimate radial velocity variations due to stellar activity using photometry

S. Aigrain[1]*, F. Pont*[2]*, S. Zucker*[3]

[1] Sub-department of Astrophysics, Department of Physics, University of Oxford, Oxford OX1 3RH, UK
[2] Astrophysics Group, School of Physics, University of Exeter, Exeter EX4 4QL, UK
[3] Dept. of Geophysics and Planetary Sci., Raymond and Beverly Sackler Faculty of Exact Sciences, Tel Aviv University, Tel Aviv 69978, Israel

Monthly Notices of the Royal Astronomical Society, in press (arXiv:1110.1034)

We present a new, simple method to predict activity-induced radial velocity variations using high-precision time-series photometry. It is based on insights from a simple spot model, has only two free parameters (one of which can be estimated from the light curve) and does not require knowledge of the stellar rotation period. We test the method on simulated data and illustrate its performance by applying it to MOST/SOPHIE observations of the planet host-star HD 189733, where it gives almost identical results to much more sophisticated, but highly degenerate models, and synthetic data for the Sun, where we demonstrate that it can reproduce variations well below the m s^{-1} level. We also apply it to Quarter 1 data for Kepler transit candidate host stars, where it can be used to estimate RV variations down to the 2–3 m s^{-1} level, and show that RV amplitudes above that level may be expected for approximately two thirds of the candidates we examined.

Download/Website: `http://arxiv.org/abs/1110.1034`

Contact: `suzanne.aigrain@astro.ox.ac.uk`

High precision transit observations of the exoplanet WASP-13b with the RISE instrument

S.C.C. Barros [1], D.L. Pollacco [1], N.P. Gibson [2], F.P. Keenan [1], I. Skillen [3], I.A. Steele [4]

[1] Astrophysics Research Centre, School of Mathematics and Physics, Queen's University Belfast, University Road, Belfast, BT7 1NN, UK
[2] Department of Physics, University of Oxford, Denys Wilkinson Building, Keble Road, Oxford OX1 3RH, UK
[3] Isaac Newton Group of Telescopes, Apartado de Correos 321, E-38700 Santa Cruz de la Palma, Tenerife, Spain
[4] Astrophysics Research Institute, Liverpool John Moores University, CH61 4UA, UK

MNRAS, in press (arXiv:1108.3996)

WASP-13b is a sub-Jupiter mass exoplanet orbiting a G1V type star with a period of 4.35 days. The current uncertainty in its impact parameter ($0 < b < 0.46$) results in poorly defined stellar and planetary radii. To better constrain the impact parameter we have obtained high precision transit observations with the RISE instrument mounted on 2.0 m Liverpool Telescope. We present four new transits which are fitted with an MCMC routine to derive accurate system parameters. We found an orbital inclination of 85.2 ± 0.3 degrees resulting in stellar and planetary radii of $1.56 \pm 0.04\,\mathrm{R}_{\odot}$ and $1.39 \pm 0.05\,\mathrm{R}_{\mathrm{Jup}}$, respectively. This suggests that the host star has evolved off the main-sequence and is in the shell hydrogen-burning phase. We also discuss how the limb darkening affects the derived system parameters. With a density of $0.17\,\rho_J$, WASP-13b joins the group of low density planets whose radii are too large to be explained by standard irradiation models. We derive a new ephemeris for the system, $\mathrm{T}_0 = 2455575.5136 \pm 0.0016$ (HJD) and $P = 4.353011 \pm 0.000013$ days. The planet equilibrium temperature ($T_{equ} = 1500\,\mathrm{K}$) and the bright host star ($V = 10.4$ mag) make it a good candidate for follow-up atmospheric studies.

Download/Website: `http://xxx.lanl.gov/abs/1108.3996`

Contact: `susana.barros@oamp.fr`

Views from EPOXI: Colors in our Solar System as an Analog for Extrasolar Planets

C. A. Crow[1], L. A. McFadden[2], T. D. Robinson[3], V. S. Meadows[3], T. A. Livengood[4], T. Hewagama[1,2], R. K. Barry[2], L. D. Deming[2], C. M. Lisse[5], D. D. Wellnitz[1]

[1] University of Maryland, College Park, MD US
[2] NASA Goddard Space Flight Center, Greenbelt, MD, US
[3] University of Washington, Seattle, WA, US
[4] National Center for Earth and Space Science Education, Capitol Heights, MD, US
[4] Harvard University, Cambridge, MA, US
[5] The Johns Hopkins University Applied Physics Laboratory, Laurel, MD, US

Astrophysical Journal, published, 2011ApJ...729..130C

The first visible-light studies of Earth-sized extrasolar planets will employ photometry or low-resolution spectroscopy. This work uses EPOCh medium-band filter photometry between 350 and 950 nm obtained with the Deep Impact (DI) High Resolution Instrument (HRI) of Earth, the Moon, and Mars in addition to previous full-disk observations of the other six solar system planets and Titan to analyze the limitations of using photometric colors to characterize extrasolar planets. We determined that the HRI 350, 550, and 850 nm filters are optimal for distinguishing Earth from the other planets and separating planets to first order based on their atmospheric and surface properties. Detailed conclusions that can be drawn about exoplanet atmospheres simply from a color-color plot are limited due to potentially competing physical processes in the atmosphere. The presence of a Rayleigh scattering atmosphere can be detected by an increase in the 350–550 nm brightness ratio, but the absence of Rayleigh scattering cannot be confirmed due to the existence of atmospheric and surface absorbing species in the UV. Methane and ammonia are the only species responsible for strong absorption in the 850 nm filter in our solar system. The combination of physical processes present on extrasolar planets may differ from those we see locally. Nevertheless, a generation of telescopes capable of collecting such photometric observations can serve a critical role in first-order characterization and constraining the population of Earth-like extrasolar planets.

Contact: `ddeming@astro.umd.edu`

Vetting $Kepler$ Planet Candidates with Multi-Color Photometry from the GTC: Identification of an Eclipsing Binary Star Near KOI 565

K. D. Colón[1,2]*, E. B. Ford*[1]

[1] Department of Astronomy, University of Florida, Gainesville, FL 32611, USA
[2] NSF Graduate Research Fellow

Publications of the Astronomical Society of the Pacific, in press (arXiv:1110.4385)

We report the discovery of an eclipsing binary star (KIC 7025851) near KOI 565 (KIC 7025846) based on photometric observations of KOI 565 and several nearby stars acquired in two narrow bandpasses (790.2 and 794.3±2.0 nm) nearly-simultaneously with the GTC/OSIRIS. We use the individual photometry in each bandpass as well as the colors of KOI 565 and other nearby stars to determine that the source of the transit signal initially detected by $Kepler$ is not due to a super-Earth-size planet around KOI 565. Instead, we find the source to be a background eclipsing binary star located ∼15 arcsec to the North of KOI 565. We discuss future prospects for using high-precision multi-color photometry from the GTC to determine whether additional $Kepler$ planet candidates have a planetary nature or are instead false positives (e.g., foreground or background eclipsing binaries or hierarchical triple systems). Our approach is complementary to multi-color follow-up observations of $Kepler$ planet candidates currently being conducted with the $Spitzer$ space telescope in the infrared as well as to other follow-up techniques.

Contact: knicole@astro.ufl.edu

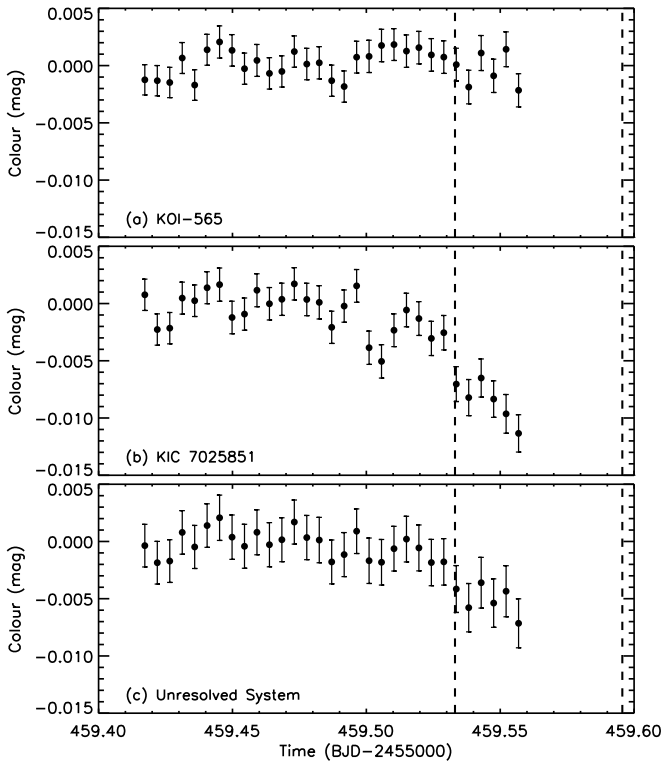

Figure 1: (Colón & Ford) The colors as computed between the 790.2 and 794.3 nm observations of (a) KOI 565, (b) a stellar EB (KIC 7025851), and (c) for an "unresolved" system (the target light combined with the light from the EB). In each panel, the vertical dashed lines indicate (from left to right) the approximate beginning of ingress and the mid-transit time (based on Borucki et al. 2011, ApJ, 736, 19). The vertical scale is the same for each panel for ease of comparison. There is no change in the color seen for KOI 565, but for the EB as well as the hypothetical unresolved system, we measure an appreciable difference in the color during the transit event.

Lack of Inflated Radii for *Kepler* Giant Planet Candidates Receiving Modest Stellar Irradiation

Brice-Olivier Demory, Sara Seager
Department of Earth, Atmospheric and Planetary Sciences, MIT, 77 Massachusetts Ave., Cambridge, MA 02139, USA

Astrophysical Journal, in press (arXiv:1110.6180)

The most irradiated transiting hot Jupiters are characterized by anomalously inflated radii, sometimes exceeding Jupiter's size by more than 60%. While different theoretical explanations have been applied, none of them provide a universal resolution to this observation, despite significant progress in the past years. We refine the photometric transit light curve analysis of 115 *Kepler* giant planet candidates based on public Q0-Q2 photometry. We find that 14% of them are likely false positives, based on their secondary eclipse depth. We report on planet radii vs. stellar flux. We find an increase in planet radii with increased stellar irradiation for the *Kepler* giant planet candidates, in good agreement with existing hot Jupiter systems. We find that in the case of modest irradiation received from the stellar host, giant planets do not have inflated radii, and appear to have radii independent of the host star incident flux. This finding suggests that the physical mechanisms inflating hot Jupiters become ineffective below a given orbit-averaged stellar irradiation level of 2×10^8 erg s^{-1} cm^{-2}.

Download/Website: `http://arxiv.org/abs/1110.6180`

Contact: `demory@mit.edu`

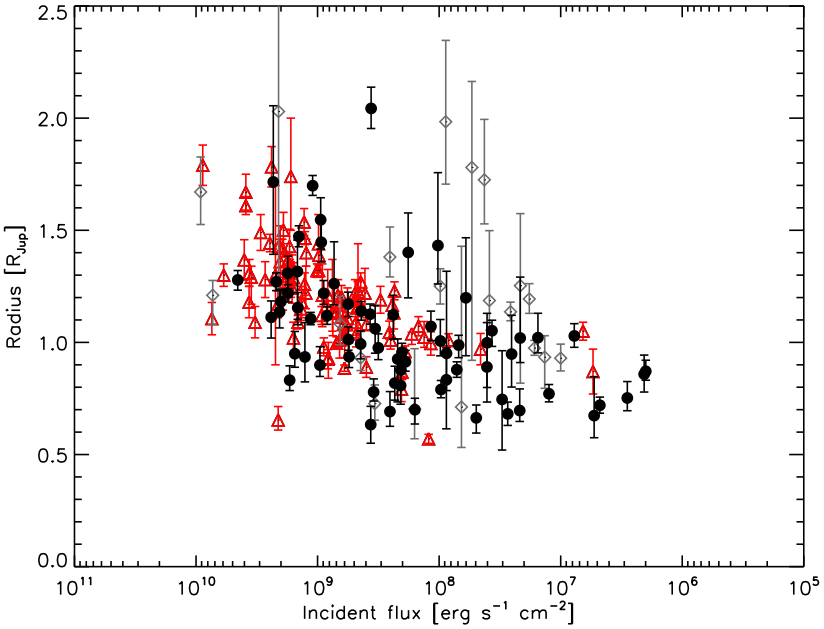

Figure 2: (Demory & Seager) Planetary radii as a function of incident flux. Black filled circles are KOI ranked as planetary candidates in the frame of this work while gray diamonds represent KOI whose origin is ambiguous (see Sect. 3). Transiting giant planets previously published, and mostly from ground-based surveys, are shown as red triangles. The relevant parameters R_p, R_s, T_{eff} and a have been drawn from http://www.inscience.ch/transits on August 29, 2011.

The Jeans Mass as a Fundamental Measure of Self-Gravitating Disc Fragmentation and Initial Fragment Mass

D. Forgan[1]*, K. Rice*[1]

Scottish Universities Physics Alliance (SUPA), Institute for Astronomy, University of Edinburgh, Blackford Hill, Edinburgh, EH9 3HJ, Scotland

Monthly Notices of the Royal Astronomical Society, published (2011MNRAS.417.1928F)

As a formation route for objects such as giant planets and low-mass stars in protostellar discs (as well as stars in AGN discs), theories of self-gravitating disc fragmentation need to be able to predict the initial masses of fragments. We describe a means by which the local Jeans mass inside the spiral structure of a self-gravitating disc can be estimated. If such a self-gravitating disc satisfies the criteria for disc fragmentation, this estimate provides a lower limit for the initial mass of any fragments formed. We apply this approach to a series of self-gravitating protostellar disc models, to map out the typical masses of fragments produced by this formation mode. We find a minimum fragment mass of around 3 Jupiter masses, which is insensitive to the stellar mass, and that - within the parameter space surveyed - fragments with masses between 10 and 20 Jupiter masses are the most common. We also describe how the Jeans mass allows us to derive a more general criterion for disc fragmentation, which accounts for the processes of viscous heating, radiative cooling, accretion and the disc's thermal history. We demonstrate how such a criterion can be determined, and show that in limiting cases it recovers several fragmentation criteria that have been posited in the past, including the minimum cooling time/maximum stress criterion.

Download/Website: `http://adsabs.harvard.edu/abs/2011MNRAS.417.1928F`

Contact: `dhf@roe.ac.uk`

A Lower Angular Momentum Limit for Self-Gravitating Protostellar Disc Fragmentation

D. Forgan[1]*, K. Rice*[1]

Scottish Universities Physics Alliance (SUPA), Institute for Astronomy, University of Edinburgh, Blackford Hill, Edinburgh, EH9 3HJ, Scotland

Monthly Notices of the Royal Astronomical Society, in press (arXiv:1110.4212)

We attempt to verify recent claims (made using semi-analytic models) that for the collapse of spherical homogeneous molecular clouds, fragmentation of the self-gravitating disc that subsequently forms can be predicted using the cloud's initial angular momentum alone. In effect, this condition is equivalent to requiring the resulting disc be sufficiently extended in order to fragment, in line with studies of isolated discs. We use smoothed particle hydrodynamics with hybrid radiative transfer to investigate this claim, confirming that in general, homogeneous spherical molecular clouds will produce fragmenting self-gravitating discs if the ratio of rotational kinetic energy to gravitational potential energy is greater than $\approx 5 \times 10^{-3}$, where this result is relatively insensitive to the initial thermal energy. This condition begins to fail at higher cloud masses, suggesting that sufficient mass at large radii governs fragmentation. While these results are based on highly idealised initial conditions, and may not hold if the disc's accretion from the surrounding envelope is sufficiently asymmetric, or if the density structure is perturbed, they provide a sensible lower limit for the minimum angular momentum required to fragment a disc in the absence of significant external turbulence.

Download/Website: `http://arxiv.org/abs/1110.4212`

Contact: `dhf@roe.ac.uk`

Collisions of inhomogeneous pre-planetesimals

Ralf J. Geretshauser[1], *Roland Speith*[2], *Wilhelm Kley*[1]

[1] Institut für Astronomie und Astrophysik, Abteilung Computational Physics, Eberhard Karls Universität Tübingen, Auf der Morgenstelle 10, 72076 Tübingen, Germany
[2] Physikalisches Institut, Eberhard Karls Universität Tübingen, Auf der Morgenstelle 14, 72076 Tübingen, Germany

Astronomy & Astrophysics, accepted (arXiv:1110.6439

In the framework of the coagulation scenario, kilometre-sized planetesimals form by subsequent collisions of pre-planetesimals of sizes from centimetre to hundreds of metres. Pre-planetesimals are fluffy, porous dust aggregates, which are inhomogeneous owing to their collisional history. Planetesimal growth can be prevented by catastrophic disruption in pre-planetesimal collisions above the destruction velocity threshold. We develop an inhomogeneity model based on the density distribution of dust aggregates, which is assumed to be a Gaussian distribution with a well-defined standard deviation ϕ_σ. As a second input parameter, we consider the typical size of an inhomogeneous clump. These input parameters are easily accessible by laboratory experiments. For the simulation of the dust aggregates, we utilise a smoothed particle hydrodynamics (SPH) code with extensions for modelling porous solid bodies. The porosity model was previously calibrated for the simulation of silica dust, which commonly serves as an analogue for pre-planetesimal material. The inhomogeneity is imposed as an initial condition on the SPH particle distribution. We carry out collisions of centimetre-sized dust aggregates of intermediate porosity. We vary the standard deviation of the inhomogeneous distribution at fixed typical clump size. The collision outcome is categorised according to the four-population model. We show that inhomogeneous pre-planetesimals are more prone to destruction than homogeneous aggregates. Even slight inhomogeneities can lower the threshold for catastrophic disruption. For a fixed collision velocity, the sizes of the fragments decrease with increasing inhomogeneity. Pre-planetesimals with an active collisional history tend to be weaker. This is a possible obstacle to collisional growth and needs to be taken into account in future studies of the coagulation scenario.

Download/Website: `http://arxiv.org/abs/1110.6439`

Contact: `ralf.j.geretshauser@uni-tuebingen.de`

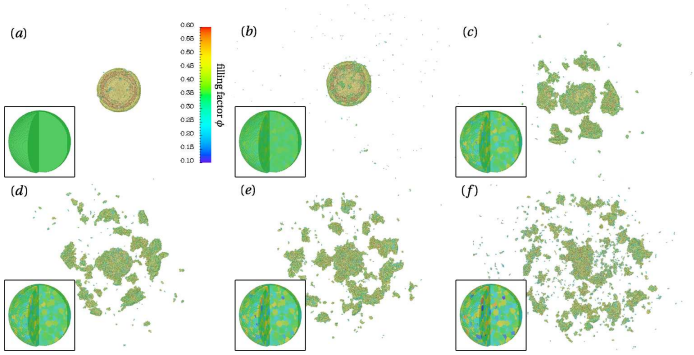

Figure 3: (Geretshauser et al.) Outcome of a collision between a target (inset) and projectile with the same Gaussian density distribution ϕ_σ for different inhomogeneities. In all cases, the target and projectile radii are $r_\mathrm{t} = 10$ cm and $r_\mathrm{p} = 6$ cm, respectively, and the collision velocity is $v_0 = 10$ m/s. The initial standard deviations are $\phi_\sigma = 0$ (a), $\phi_\sigma = 0.01$ (b), $\phi_\sigma = 0.02$ (c), $\phi_\sigma = 0.03$ (d), $\phi_\sigma = 0.04$ (e), and $\phi_\sigma = 0.05$ (f). The collision outcome is shown in the impact direction. In the homogeneous case (a) and for small inhomogeneities (b), the target stays intact and forms one massive object with the projectile. For $\phi_\sigma \geq 0.02$, the target fragments (c-d). The fragment sizes decrease with increasing ϕ_σ and at the same time the number of fragments increases.

Substellar-Mass Companions to the K-Giants HD 240237, BD +48 738 and HD 96127

S. Gettel[1,2]*, A. Wolszczan*[1,2]*, A. Niedzielski*[3]*, G. Nowak*[3]*, M. Adamów*[3]*, P. Zieliński*[3] *& G. Maciejewski*[3]

[1] Department of Astronomy and Astrophysics, the Pennsylvania State University, 525 Davey Laboratory, University Park, PA 16802
[2] Center for Exoplanets and Habitable Worlds, the Pennsylvania State University, 525 Davey Laboratory, University Park, PA 16802
[3] Toruń Center for Astronomy, Nicolaus Copernicus University, ul. Gagarina 11, 87-100 Toruń, Poland

Astrophysical Journal, in press (2011arXiv1110.1641G)

We present the discovery of substellar-mass companions to three giant stars by the ongoing Penn State-Toruń Planet Search (PTPS) conducted with the 9.2 m Hobby-Eberly Telescope. The most massive of the three stars, K2-giant HD 240237, has a 5.3 M_J minimum mass companion orbiting the star at a 746-day period. The K0-giant BD +48 738 is orbited by a $\geq$ 0.91 M_J planet which has a period of 393 days and shows a non-linear, long-term radial velocity trend that indicates a presence of another, more distant companion, which may have a substellar mass or be a low-mass star. The K2-giant HD 96127, has a $\geq$ 4.0 M_J mass companion in a 647-day orbit around the star. The two K2-giants exhibit a significant RV noise that complicates the detection of low-amplitude, periodic variations in the data. If the noise component of the observed RV variations is due to solar-type oscillations, we show, using all the published data for the substellar companions to giants, that its amplitude is anti-correlated with stellar metallicity.

Download/Website: `http://arxiv.org/abs/1110.1641`

Contact: `sgettel@astro.psu.edu`

Detection of the Water Reservoir in a Forming Planetary System

M. R. Hogerheijde[1]*, E. A. Bergin*[2]*, C. Brinch*[1]*, L. I. Cleeves*[2]*, J. K. J. Fogel*[2]*, G. A. Blake*[3]*, C. Dominik*[4]*, D. C. Lis*[5]*, G. Melnick*[6]*, D. Neufeld*[7]*, O. Panić*[8]*, J. C. Pearson*[9]*, L. Kristensen*[1]*, U. A. Yıldız*[1]*, E. F. van Dishoeck*[1,10]

[1] Leiden Observatory, Leiden University, The Netherlands
[2] Department of Astronomy, University of Michigan, Ann Arbor MI, USA
[3] Div. of Geological and Planetary Sciences, California Institute of Technology, Pasadena CA, USA
[4] Astronomical Institute 'Anton Pannekoek', University of Amsterdam, The Netherlands
[5] Div. of Physics, Mathematics, and Astronomy, California Institute of Technology, Pasadena CA, USA
[6] Harvard-Smithsonian Center for Astrophysics, Cambridge MA, USA
[7] Dept. of Physics and Astronomy, Johns Hopkins University, Baltimore MD, USA
[8] European Southern Observatory, Garching, Germany
[9] Jet Propulsion Laboratory, California Institute of Technology, Pasadena CA, USA
[10] Max-Planck-Institut für Extraterrestrische Physik, Garching, Germany

Science, vol. 334 no. 6054 pp. 338–340

Icy bodies may have delivered the oceans to the early Earth, yet little is known about water in the ice-dominated regions of extra-solar planet-forming disks. The Heterodyne Instrument for the Far-Infrared on-board the Herschel Space Observatory has detected emission from both spin isomers of cold water vapor from the disk around the young star TW Hydrae. This water vapor likely originates from ice-coated solids near the disk surface hinting at a water ice reservoir equivalent to several thousand Earth Oceans in mass. The water's ortho-to-para ratio falls well below that of Solar System comets, suggesting that comets contain heterogeneous ice mixtures collected across the entire solar nebula during the early stages of planetary birth.

Download/Website: `http://arxiv.org/abs/1110.4600`

Contact: `michiel@strw.leidenuniv.nl`

On the detection of (habitable) super-Earths around low-mass stars using Kepler and transit timing variation method

N. Haghighipour[1], *S. Kirste*[2]

[1] Institute for Astronomy, University of Hawaii, Honolulu, USA
[2] Zentrum für Astronomie und Astrophysik (ZAA), Technische Universität Berlin, 10623 Berlin, Germany

Celestial Mechanics and Dynamical Astronomy (Special issue on extrasolar planets), Volume 111, Issue 1-2, pp. 267-284 (ADS-Bibcode:2011CeMDA.111..267H)

We present the results of an extensive study of the detectability of Earth-sized planets and super-Earths in the habitable zones of cool and low-mass stars using transit timing variation method. We have considered a system consisting of a star, a transiting giant planet, and a terrestrial-class perturber, and calculated TTVs for different values of the parameters of the system. To identify ranges of the parameters for which these variations would be detectable by Kepler, we considered the analysis presented by Ford et al. (Transit timing observations from Kepler: I. Statistical analysis of the first four months. ArXiv:1102.0544, 2011) and assumed that a peak-to-peak variation of 20 s would be within the range of the photometric sensitivity of this telescope. We carried out simulations for resonant and non-resonant orbits, and identified ranges of the semimajor axes and eccentricities of the transiting and perturbing bodies for which an Earth-sized planet or a super-Earth in the habitable zone of a low-mass star would produce such TTVs. Results of our simulations indicate that in general, outer perturbers near first- and second-order resonances show a higher prospect for detection. Inner perturbers are potentially detectable only when near 1:2 and 1:3 mean-motion resonances. For a typical M star with a Jupiter-mass transiting planet, for instance, an Earth-mass perturber in the habitable zone can produce detectable TTVs when the orbit of the transiting planet is between 15 and 80 days. We present the details of our simulations and discuss the implication of the results for the detection of terrestrial planets around different low-mass stars.

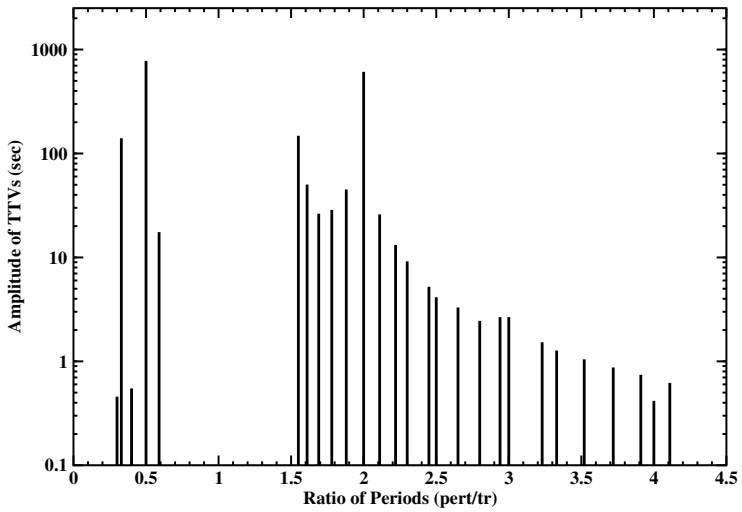

Figure 4: (Haghighipour & Kirste) The maximum amplitude of TTVs for a three-body system with a $0.367 M_{\odot}$ star, a Jupiter-mass transiting planet in a 10-day orbit, and an Earth-mass perturber when the perturber is near different low-order interior and exterior mean-motion resonances.

Super-Earths: A New Class of Planetary Bodies

N. Haghighipour
Institute for Astronomy, University of Hawaii, Honolulu, USA

Journal of Contemporary Physics, vol. 52, issue 5, pp. 403-438 (ADS-Bibcode: 2011ConPh..52..403H)

Super-Earths, a class of planetary bodies with masses ranging from a few Earth-masses to slightly smaller than Uranus, have recently found a special place in the exoplanetary science. Being slightly larger than a typical terrestrial planet, super-Earths may have physical and dynamical characteristics similar to those of Earth whereas unlike terrestrial planets, they are relatively easier to detect. Because of their sizes, super-Earths can maintain moderate atmospheres and possibly dynamic interiors with plate tectonics. They also seem to be more common around low-mass stars where the habitable zone is in closer distances. This article presents a review of the current state of research on super-Earths, and discusses the models of the formation, dynamical evolution, and possible habitability of these objects. Given the recent advances in detection techniques, the detectability of super-Earths is also discussed, and a review of the prospects of their detection in the habitable zones of low-mass stars is presented.

Download/Website: `www.tandfonline.com/r/contemphys`

Contact: `nader@ifa.hawaii.edu`

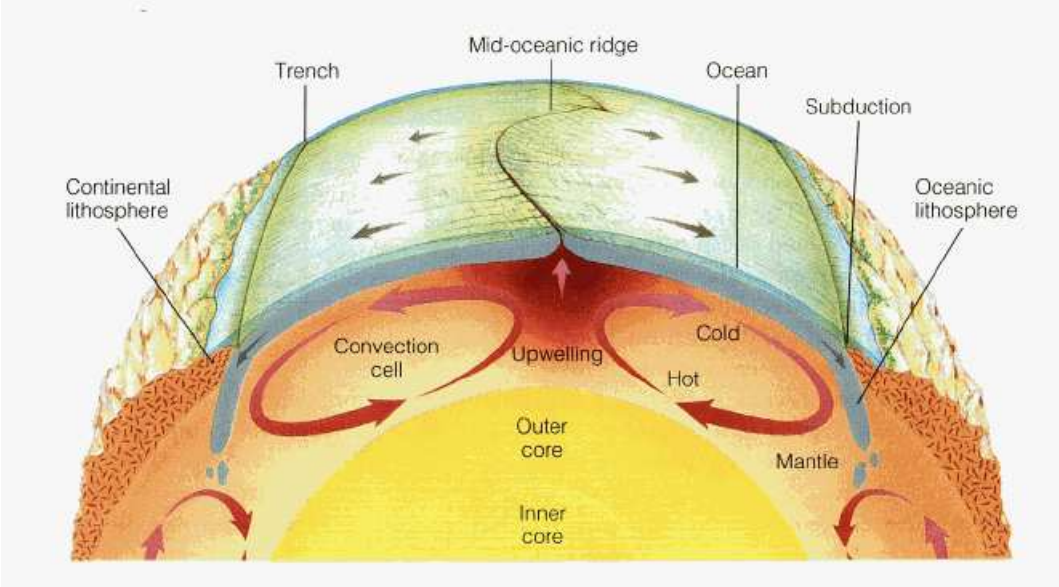

Figure 5: (Haghighipour) Artistic illustration of conduction cells in Earths mantle.

New Light-Travel Time Models and Orbital Stability Study of the Proposed Planetary System HU Aquarii

T.C. Hinse[1,2], J.W. Lee[1], K. Goździewski[3], N. Haghighipour[4], C.-U. Lee[1], E.M. Scullion[5]

[1] Korea Astronomy and Space Science Institute, 776 Daedukdae-ro, Yuseong-gu, 305-348, Daejeon, Republic of Korea.
[2] Armagh Observatory, College Hill, BT61 9DG, Armagh, UK.
[3] Nicolaus Copernicus University, Torun Centre for Astronomy, PL-87-100 Torun, Poland.
[4] Institute for Astronomy & NASA Astrobiology Institute, University of Hawaii, 96822 HI, USA.
[5] Institute of Theoretical Astrophysics, University of Oslo, 0371 Oslo, Norway.

Monthly Notices of the Royal Astronomical Society, (submitted)

In this work we propose a new orbital architecture for the two proposed circumbinary planets around the polar eclipsing binary HU Aquarii. We base the new two-planet, light-travel time model on the result of a Monte Carlo simulation driving a least-squares Levenberg-Marquardt minimisation algorithm on the observed eclipse egress times. Our best-fit with $\chi^2_r = 1.43$ resulted in high final eccentricities for the two companions leading to an unstable orbital configuration. From a large ensemble of initial guesses we examined the distribution of final eccentricities and semi-major axes for different best-fit χ^2_r parameter intervals and encountered qualitatively a second population of best-fit parameters. The main characteristic of this population is described by low-eccentric orbits favouring long-term orbital stability of the system. We present our best-fit candidate for the proposed two-planet system and demonstrate orbital stability over one million years using numerical integrations.

Contact: tchinse@gmail.com

Revisiting the proposed planetary system orbiting the eclipsing polar HU Aquarii

Robert A. Wittenmyer[1], J. Horner[1], J. P. Marshall[2], O. W. Butters[3], & C. G. Tinney[1]

[1] Department of Astrophysics and Optics, School of Physics, University of New South Wales, Sydney 2052, Australia
[2] Departmento Física Teórica, Facultad de Ciencias, Universidad Autónoma de Madrid, Cantoblanco, 28049, Madrid, España
[3] Department of Physics and Astronomy, University of Leicester, Leicester, LE1 7RH, UK

Monthly Notices of the Royal Astronomical Society, in press; arXiv:1110.2542

It has recently been proposed, on the basis of eclipse-timing data, that the eclipsing polar HU Aquarii is host to at least two giant planets. However, that result has been called into question based upon the dynamical stability of the proposed planets. In this work, we present a detailed re-analysis of all available eclipse timing data available for the HU Aquarii system, making use of standard techniques used typically to fit orbits using radial-velocity data. We find that the eclipse timings can be used to obtain a two-planet solution that does not require the presence of additional bodies within the system. We then perform a highly detailed dynamical analysis of the proposed planetary system, and show that, despite the improved orbital parameters derived compared to earlier studies of the system, the proposed planets are typically dynamically unstable on unfeasibly short timescales (typically of order 10^4 years or less). Although small islands of stability are present across the range of allowed orbits, these represent only a small fraction of the total sample tested. Given these results, we discuss briefly how the observed signal might in fact be the result of the intrinsic properties of the eclipsing polar, rather than being evidence of dynamically improbable planets. Taken in concert, our results highlight the need for caution in interpreting such timing variations as being planetary in nature.

Download/Website: http://arxiv.org/pdf/1110.2542

Contact: rob@phys.unsw.edu.au

A photochemical model for the carbon-rich planet WASP-12b

R. K. Kopparapu[1,2]*, J. F. Kasting*[1,2]*, K. J. Zahnle*[3]

[1] Department of Geosciences, Penn State University, 443 Deike Building, University Park, PA 16802, USA
[2] Virtual Planetary Laboratory
[3] NASA Ames Research Center, MS 245-3, Moffett Field, CA 94035

Accepted to Astrophysical Journal, arXiv:1110.2793

The hot Jupiter WASP-12b is a heavily irradiated exoplanet in a short period orbit around a G0-star with twice the metallicity of the Sun. A recent thermochemical equilibrium analysis based on Spitzer and ground-based infrared observations suggests that the presence of CH_4 in its atmosphere and the lack of H_2O features can only be explained if the carbon-to-oxygen ratio in the planet's atmosphere is much greater than the solar ratio ($[C]/[O] = 0.54$). Here, we use a 1-D photochemical model to study the effect of disequilibrium chemistry on the observed abundances of H_2O, CO, CO_2 and CH_4 in the WASP-12b atmosphere. We consider two cases: one with solar $[C]/[O]$ and another with $[C]/[O] = 1.08$. The solar case predicts that H_2O and CO are more abundant than CO_2 and CH_4, as expected, whereas the high $[C]/[O]$ model shows that CO, C_2H_2 and HCN are more abundant. This indicates that the extra carbon from the high $[C]/[O]$ model is in hydrocarbon species. H_2O photolysis is the dominant disequilibrium mechanism that alters the chemistry at higher altitudes in the solar $[C]/[O]$ case, whereas photodissociation of C_2H_2 and HCN is significant in the super-solar case. Furthermore, our analysis indicates that C_2H_2 is the major absorber in the atmosphere of WASP-12b and the absorption features detected near 1.6 and 8 micron may be arising from C_2H_2 rather than CH_4. The Hubble Space Telescope's WFC3 can resolve this discrepancy, as C_2H_2 has absorption between $1.51 - 1.54$ microns, while CH_4 does not.

Download/Website: `http://lanl.arxiv.org/abs/1110.2793`

Contact: `ruk15@psu.edu`

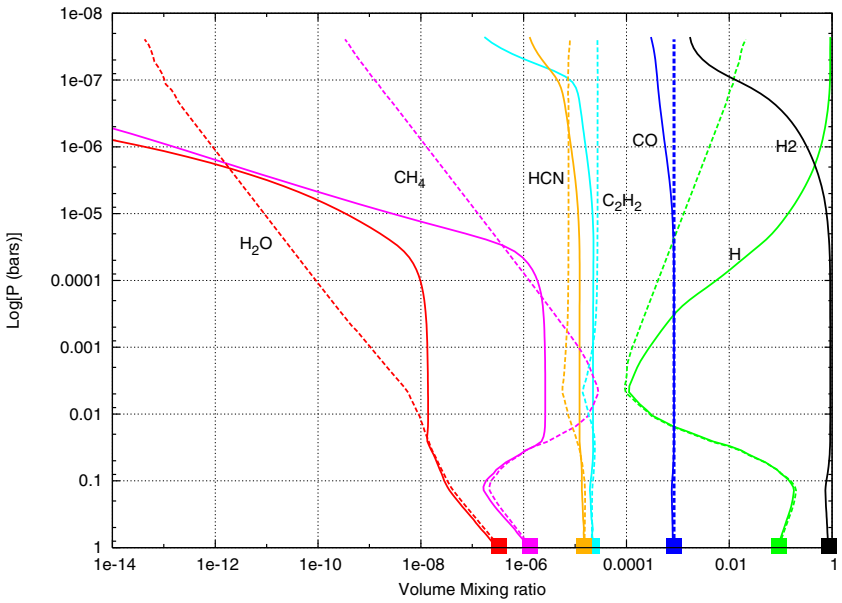

Figure 6: (Kopparapu et al.) Equilibrium (dashed) and photochemical (solid) mixing ratio profiles of major species, for $[C]/[O] = 0.54$ (the solar value). Filled squares represent equilibrium values at the lower boundary. The mixing ratios refer to volume mixing ratio. The Helium abundance is 0.07836.

Properties of an Earth-Like Planet Orbiting a Sun-Like Star: Earth Observed by the EPOXI Mission

T. A. Livengood[1,2], *L. D. Deming*[2,3], *M. F. A'Hearn*[3], *D. Charbonneau*[4], *T. Hewagama*[2,3], *C. M. Lisse*[5], *L. A. McFadden*[2], *V. S. Meadows*[6], *T. D. Robinson*[6], *S. Seager*[7], *D. D. Wellnitz*[3]

[1] National Center for Earth and Space Science Education, Capitol Heights, MD, US
[2] NASA Goddard Space Flight Center, Greenbelt, MD, US
[3] University of Maryland, College Park, MD US
[4] Harvard University, Cambridge, MA, US
[5] The Johns Hopkins University Applied Physics Laboratory, Laurel, MD, US
[6] University of Washington, Seattle, WA, US
[7] Massachusetts Institute of Technology, Cambridge, MA, US

Astrobiology, in press for Vol. 11, # 9

NASA's EPOXI mission has observed disc-integrated Earth and Moon to test techniques for reconnoitering extrasolar terrestrial planets, using the Deep Impact flyby spacecraft to observe Earth at the beginning and end of northern-hemisphere spring, 2008, from a range of $\sim 1/6^{th}$ to $1/3^{rd}$ AU. These observations furnish high-precision and high-cadence empirical photometry and spectroscopy of Earth, suitable as ground truth for numerically simulating realistic observational scenarios for an Earth-like exoplanet with finite signal-to-noise ratio. Earth was observed at near-equatorial sub-spacecraft latitude on 18–19 March, 28–29 May, and 4–5 June (UT), in the range 372–4540 nm wavelength with low visible resolving power ($\lambda/\Delta\lambda = 5 - 13$) and moderate infrared resolving power ($\lambda/\Delta\lambda = 215 - 730$). Spectrophotometry in seven filters yields lightcurves at $sim372 - 948$ nm filter-averaged wavelength, modulated by Earths rotation with peak-to-peak amplitude of $\leq 20\%$. The spatially resolved Sun-glint is a minor contributor to disc-integrated reflectance. Spectroscopy at 1100–4540 nm reveals gaseous water and carbon dioxide, with minor features of molecular oxygen, methane, and nitrous oxide. One-day changes in global cloud cover resulted in differences between the lightcurve beginning and end of $\leq 5\%$. The lightcurve of a lunar transit of Earth on 29 May is color-dependent due to the Moon's red spectrum partially occulting Earths relatively blue spectrum. The "vegetation red edge" spectral contrast observed between two long-wavelength visible/near-infrared bands is ambiguous, not clearly distinguishing between the verdant Earth diluted by cloud cover *vs.* the desolate mineral regolith of the Moon. Spectrophotometry in at least one other comparison band at short wavelength is required to distinguish between Earth-like and Moon-like surfaces in reconnaissance observations. However, measurements at 850 nm alone, the high-reflectance side of the red edge, could be sufficient to establish periodicity in the lightcurve and deduce Earths diurnal period and the existence of fixed surface units.

Contact: timothy.a.livengood@nasa.gov

Ground-Based Sub-Millimagnitude CCD Photometry of Bright Stars using Snapshot Observations

A. Mann[1], *E. Gaidos*[2], *G. Aldering*[3]

[1] Institute for Astronomy, University of Hawaii, Honolulu, HI 96822
[2] Department of Geology and Geophysics, University of Hawaii, Honolulu, HI 96822
[3] Lawrence Berkeley National Lab, One Cyclotron Rd, Berkeley, CA 94720

Publications of the Astronomical Society of the Pacific, in press (arXiv:1109.1358v1)

We demonstrate ground-based sub-millimagnitude ($< 10^{-3}$) photometry of widely-separated bright stars using "snapshot" CCD imaging. We routinely achieved this photometric precision by (i) choosing nearby comparison stars of a similar magnitude and spectral type; (ii) defocusing the telescope to allow high signal ($> 10^7$ e$^-$) to be acquired in a single integration; (iii) pointing the telescope so that all stellar images fall on the same detector pixels; and (iv) using a region of the CCD detector that is free of non-linear or aberrant pixels. We describe semi-automated observations with the Supernova Integrated Field Spectrograph (SNIFS) on the University of Hawaii 2.2m telescope on Mauna Kea, with which we achieved photometric precision as good as 5.2×10^{-4} (0.56 mmag) with a 5 minute

cadence over a two hour interval. In one experiment, we monitored 8 stars, each separated by several degrees, and achieved sub-mmag precision with a cadence (per star) of $\sim$17 min. Our snapshot technique is suitable for automated searches for planetary transits among multiple, bright-stars.

Download/Website: `http://arxiv.org/abs/1109.1358`

Contact: `amann@ifa.hawaii.edu`

Compositions of Hot Super-Earth Atmospheres: exploring Kepler Candidates

Y. Miguel[1], *L. Kaltenegger*[1,2], *B. Fegley Jr.*[3], *L. Schaefer*[2]

[1] Max Planck Institut fuer Astronomie, Koenigstuhl 17, 69117, Heidelberg, Germany
[2] Harvard Smithsonian Center for Astrophysics, 60 Garden St., 02138 MA,Cambridge, USA
[3] Planetary Chemistry Laboratory, Dpt. of Earth & Planetary Sciences and Mc Donnell Center for the Space Sciences, Washington University, St. Louis, MO 63130, USA

ApJ Letters, in press (arXiv:1110.2426v1)

This paper outlines a simple approach to evaluate the atmospheric composition of hot rocky planets by assuming different types of planetary composition and using corresponding model calculations. To explore hot atmospheres above 1000 K, we model the vaporization of silicate magma and estimate the range of atmospheric compositions according to the planet's radius and semi-major axis for the *Kepler* February 2011 data release. Our results show 5 atmospheric types for hot, rocky super-Earth atmospheres, strongly dependent on the initial composition and the planet's distance to the star. We provide a simple set of parameters that can be used to evaluate atmospheric compositions for current and future candidates provided by the *Kepler* mission and other searches.

Download/Website: `http://arxiv.org/abs/1110.2426`

Contact: `miguel@mpia-hd.mpg.de`

Dust discs around intermediate mass and Sun-like stars in the 16 Myr old NGC 1960 open cluster

R. Smith, R.D. Jeffries

Astrophysics Group, Keele University, Keele, Staffordshire, ST5 5BG, UK

Monthly Notices of the Royal Astronomical Society, in press

We present an analysis of Spitzer IRAC (3.6–8μm) and MIPS (24μm) imaging of members of the 16^{+10}_{-5}Myr old open cluster NGC 1960 (M36). Models of terrestrial planet formation indicate that rocky planets are likely to achieve their final masses at around 10–30Myr, and thus this cluster is at an interesting epoch for planet formation. We find 21 B-F5 type stars and 14 F6-K9 type stars which have 24μm excess emission, and thus determine that $>30\%$ of B-F5 type stars and $>23\%$ of F6-K9 type stars in this cluster have 24μm excess emission. These excess frequencies are similar to those observed in other clusters of similar age. Three early type stars have excesses at near-infrared wavelengths. Analysis of their SEDs confirms that these are true debris discs and not remnant primordial or transitional discs. None of the 61 sun-like stars have confirmed near-infrared excess, and we can place a limit on the frequency of 8μm excess emission around sun-like stars of $<7\%$. All of the detected excesses are consistent with emission from debris discs and are not primordial.

Download/Website: `http://arxiv.org/abs/1110.4219`

Contact: `rs@astro.keele.ac.uk`

Non-Detection of the Putative Substellar Companion to HD 149382

Jackson M. Norris[1]*, Jason T. Wright*[1]*, Richard A. Wade, Suvrath Mahadevan*[1]*, Sara Gettel*[1]

[1] Center for Exoplanets and Habitable Worlds, 525 Davey Lab, The Pennsylvania State University, University Park, PA 16802
Department of Astronomy and Astrophysics, 525 Davey Lab, The Pennsylvania State University, University Park, PA 16802

Astrophysical Journal, in press (arXiv: 1110.1384)

It has been argued that a substellar companion may significantly influence the evolution of the progenitors of sdB stars. Recently, the bright sdB star HD 149382 has been claimed to host a substellar (possibly planetary) companion with a period of 2.391 days. This has important implications for the evolution of the progenitors of sdB stars as well as the source of the UV-excess seen in elliptical galaxies. In order to verify this putative companion, we made 10 radial velocity measurements of HD 149382 over 17 days with the High Resolution Spectrograph at the Hobby-Eberly Telescope. Our data conclusively demonstrate that the putative substellar companion does not exist, and they exclude the presence of almost any substellar companion with $P < 28$ days and $M \sin i \gtrsim 1\, M_{\rm Jup}$.

Download/Website: `http://arxiv.org/abs/1110.1384`

Contact: `jackson.norris@psu.edu`

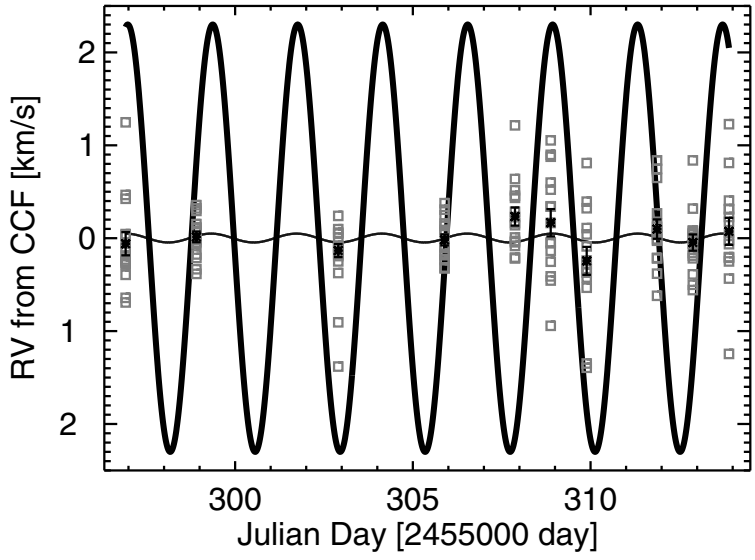

Figure 7: (Norris et al.) Gray boxes show our RV measurements for all 15 absorption features on each night. The black asterisks show the mean of each night's measurements and the associated standard error of the mean. The thin line shows our best fit within a 5σ range of P near the value reported by Geier et al. (2009). The thick line shows the sinusoid reported by Geier et al. (2009). The central value near $0\,\mathrm{km\,s^{-1}}$ does *not* represent the systemic velocity of the star, since we have subtracted the mean values of each line from their nightly values. The best fit value is consistent with the nonexistence of the putative companion.

A new code to study structures in collisionally active, perturbed debris discs. Application to binaries

P. Thebault
LESIA, Observatoire de Paris, 92195 Meudon Principal Cedex, France

Astronomy and Astrophysics, in press (arXiv:1110.3648)

Debris discs are traditionally studied using two distinct types of numerical models: statistical particle-in-a-box codes to study their collisional and size distribution evolution, and dynamical N-body models to study their spatial structure. The absence of collisions from N-body codes is in particular a major shortcoming, as collisional processes are expected to significantly alter the results obtained from pure N-body runs. We present a new numerical model, to study the spatial structure of perturbed debris discs at dynamical and collisional steady-state. We focus on the competing effects between gravitational perturbations by a massive body (planet or star), collisional production of small grains, and radiation pressure placing these grains in possibly dynamically unstable regions. We consider a disc of parent bodies at dynamical steady-state, from which small radiation-pressure-affected grains are released in a series of runs, each corresponding to a different orbital position of the perturber, where particles are assigned a collisional destruction probability. These collisional runs produce successive position maps that are then recombined, following a complex procedure, to produce surface density profiles for each orbital position of the perturbing body. We apply our code to the case of a circumprimary disc in a binary. We find pronounced structures inside and outside the dynamical stability regions. For low e_B, the disc's structure is time varying, with spiral arms in the dynamically "forbidden" region precessing with the companion star. For high e_B, the disc is strongly asymmetric but time invariant, with a pronounced density drop in the binary's periastron direction.

Download/Website: `http://arxiv.org/abs/1110.3648`

Contact: `philippe.thebault@obspm.fr`

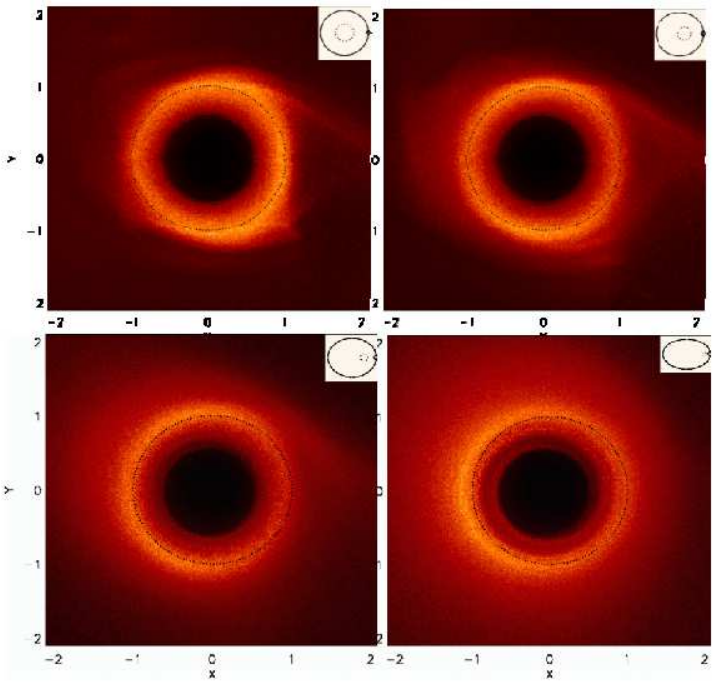

Figure 8: (Thebault) Surface density maps, at dynamical *and* collisional steady state, for a circumprimary debris disc perturbed by a companion star of eccentricity $e_B = 0$ (top left), $e_B = 0.2$ (top right), $e_B = 0.5$ (bottom left) and $e_B = 0.75$ (bottom right). Densities are displayed at periastron passages of the companion. The dotted line represents the outer limit for orbital stability around the primary. (An animated version of this image can be found at: http://lesia.obspm.fr/perso/philippe-thebault/bindeb.html)

Corrigendum to "The upper atmosphere of the exoplanet HD209458b revealed by the sodium D lines: Temperature-pressure profile, ionization layer and thermosphere" [2011, A&A, 527, A110]

A. Vidal-Madjar,[1] *C.M Huitson,*[2] *A. Lecavelier des Etangs,*[1] *D.K. Sing,*[2] *R. Ferlet,*[1] *J.-M. Désert*[3], *G. Hébrard*[1], *I. Boisse*[1], *D. Ehrenreich*[4], *C. Moutou*[5]

[1] CNRS, UPMC, Institut d'astrophysique de Paris, Paris, France
[2] Astrophysics Group, School of Physics, University of Exeter, Exeter, UK
[3] Harvard-Smithsonian Center for Astrophysics, Cambridge, USA
[4] Laboratoire d'Astrophysique de Grenoble, Université Joseph Fourier, CNRS, Grenoble, France
[5] Laboratoire d'Astrophysique de Marseille, Marseille, France

Published in Astronomy & Astrophysics, 533, C4 (2011A&A...533C...4V/ arXiv:1110.5750)

An error was detected in the code used for the analysis of the HD209458b sodium profile (Vidal-Madjar et al. 2011). Here we present an updated T-P profile and briefly discuss the consequences.

Download/Website: `http://arxiv.org/abs/1110.5750`

Contact: `alfred@iap.fr`

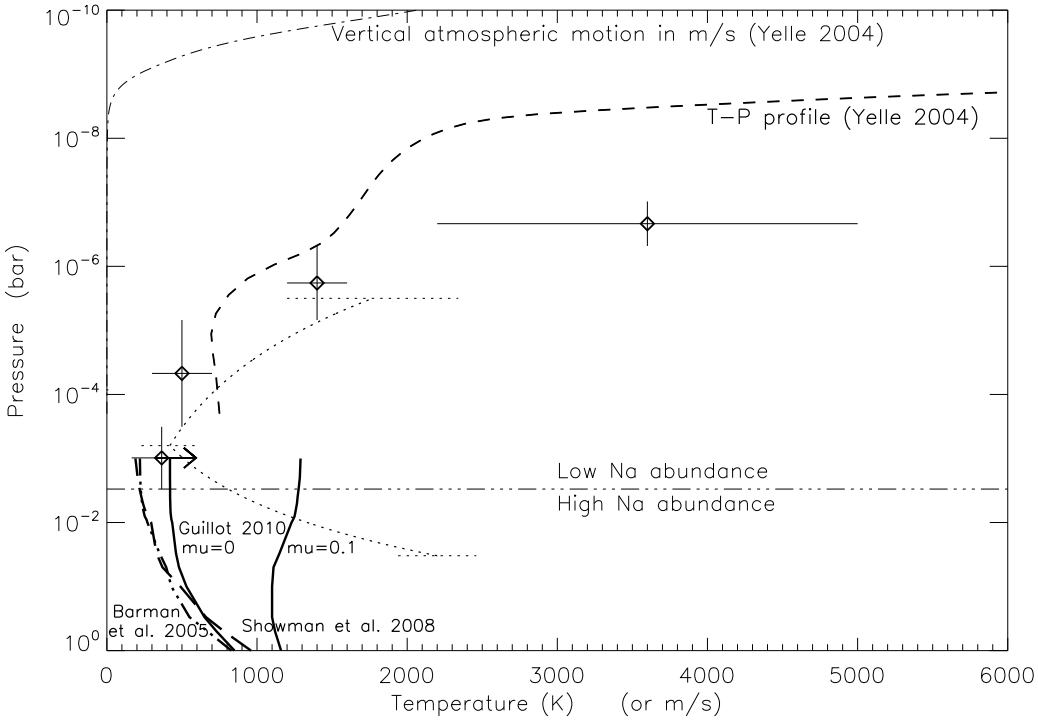

Figure 9: (Vidal-Madjar et al.) Plot of the new T-P profile (diamonds). The symbols are the same as in Fig. 9 of Vidal-Madjar et al. (2011). The vertical error bars show the altitude regime over which we fit each temperature. The new T-P profile remains consistent with the T-P profile obtained by Sing et al. (2008) using a parametric fit of the same data set (dotted line).

Free collisions in a microgravity many-particle experiment. I. Dust aggregate sticking at low velocities

R. Weidling[1], *C. Güttler*[2,1], *J. Blum*[1]

[1] Institut für Geophysik und extraterrestrische Physik, Technische Universität zu Braunschweig, Germany
[2] Department of Earth and Planetary Sciences, Kobe University, Japan

Icarus, in press (doi:10.1016/j.icarus.2011.10.002 / arXiv:1105.3909)

Over the past years the processes involved in the growth of planetesimals have extensively been studied in the laboratory. Based on these experiments, a dust-aggregate collision model was developed upon which computer simulations were based to evaluate how big protoplanetary dust aggregates can grow and to analyze which kinds of collisions are relevant in the solar nebula and are worth further studies in the laboratory. The sticking threshold velocity of millimeter-sized dust aggregates is one such critical value that had so far only theoretically been derived, as the relevant velocities could not be reached in the laboratory. We developed a microgravity experiment that allows us for the first time to study free collisions of mm-sized dust aggregates down to velocities of ~ 0.1 cm/s to assess this part of the protoplanetary dust evolution model. Here, we present the results of 125 free collisions between dust aggregates of 0.5 to 2 mm diameter. Seven collisions with velocities between 0.2 and 3 cm/s led to sticking (c.f. image sequence), suggesting a transition from perfect sticking to perfect bouncing with a certain sticking probability instead of a sharp velocity threshold. We developed a model to explain the physical processes involved in dust-aggregate sticking, derived dynamical material properties of the dust aggregates from the results of the collisions, and deduced the velocity below which dust aggregates always stick. For millimeter-sized porous dust aggregates this velocity is $8 \cdot 10^{-5}$ m/s.

Download/Website: `http://arxiv.org/abs/1105.3909`

Contact: `r.weidling@tu-braunschweig.de`

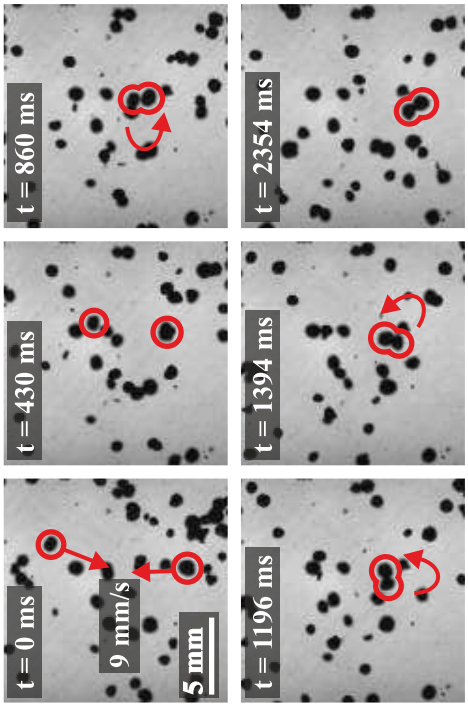

Figure 10: (Weidling et al.) Image sequence of a collision of two dust aggregates with a relative velocity of 9 mm/s. After the contact at t = 860 ms, they stick to each other and revolve around their common center of mass.

3 Jobs and Positions

Postdocs in Paradise

Eric Gaidos
University of Hawaii at Manoa, Honolulu, Hawaii USA

University of Hawaii, 1st January 2012

Two Postdoctoral Positions in Exoplanet Research at the University of Hawaii at Manoa

Searches for exoplanets: The successful applicant to this position will contribute to an ongoing Doppler and transit search for exoplanets around cool stars, and characterization of transiting planets using Mauna Kea and other observatories. Requirements: Ph.D. in physics, astrophysics, or astronomy, and previous observing experience.

Exoplanet atmospheres and interiors: The successful applicant will conduct research into on one or more topics involving the incorporation of volatiles into planets, the formation and properties of primordial atmospheres, subsolidus convection and melting of the interior, and the exchange of volatiles between the interior and surface, Requirements: Ph.D. in a relevant field (astrophysics, planetary science, geophysics), and strong numerical modeling skills.

Each postdoc will interact with other investigators in an interdisciplinary environment, and be encouraged to demonstrate leadership in a particular specialty. Each position is initially for one year, with a second year depending on research performance, and a third year depending on performance and funding. Each position offers an annual stipend of $52,000 and the opportunity to live in Honolulu, the top-ranked U.S. city in the 2010 Mercer Quality of Living Survey. Starting date: January 1, 2012 or as soon as possible thereafter. To apply, send a 2-page CV, including publication list, and names and contact information of 2 references to Eric Gaidos (gaidos@hawaii.edu)

Contact: `gaidos@hawaii.edu`

PhD positions in the formation and evolution of exoplanets

Anders Johansen
Lund University, Box 43, 221 00 Lund, Sweden

Lund University, Due: 14 November 2011, Starting: as soon as possible in 2012

Lund University invites applicants to up to three PhD positions working on theoretical models of planet formation and evolution of planetary systems, funded independently by a Starting Grant from the European Research Council and by the Swedish Research Council. Two students will be supervised by Dr. Anders Johansen and one jointly between Dr. Anders Johansen and Prof. Melvyn B. Davies.
The PhD students will work on theoretical/computational models of planet formation and orbital evolution. Planet formation research at Lund Observatory focuses on hydrodynamical models of planet formation and orbital dynamics models of planetary systems. Together with the current group members and a new postdoc funded by the European Research Council, the new PhD students will work in an inspiring environment towards the common goal of formulating and testing a new planet formation theory framework that is self-consistent as well as consistent with observational constraints.
Closing date: 14 November 2011

Download/Website: `http://www.astro.lu.se/vacancies/`

Contact: `anders@astro.lu.se`

PhD Program in Astronomy at Leiden University - 2 possible Exoplanet Projects

Ignas Snellen
Leiden Observatory, Leiden University, The Netherlands

Leiden Observatory, Deadline: December 16, 2011; start date: Autumn 2012

Leiden Observatory invites applications for more than ten PhD positions. There are 2 possible openings (funding is pending) in the extrasolar planet group of Ignas Snellen. Research focuses on atmospheres of transiting planets, concentrating on optical and near-infrared secondary eclipse photometry and transmission spectroscopy.
Leiden Observatory, founded in 1633, is the oldest university astronomy department in the world. With about 25 faculty, over 40 postdoctoral associates and about 65 PhD students it is the largest astronomy department in the Netherlands. Leiden is a charming university town with international flair. Most Leiden researchers have an international background. English is the common language.
During their thesis, Leiden PhD students are paid as civil servants, which means that they earn competitive salaries (the current annual gross salary, including allowances, increases from about EUR 28,000 in year 1 to about EUR 36,000 in year 4) and are eligible for both social security and retirement benefits. PhD positions are funded for four years.
Application forms and instructions are available at http://www.strw.leidenuniv.nl/phd/. Applicants are requested to upload a curriculum vitae, a list of all university courses taken and transcripts of grades obtained, brief statements of research interests and experience, and the contact information for at least two referees. The successful candidates must have a MSc degree (or equivalent) by the starting date. The positions are open to candidates from all countries. The research will be carried out in the framework of the Netherlands Research School for Astronomy (NOVA). Please do not hesitate to contact Ignas Snellen for further information.

Download/Website: `http://www.strw.leidenuniv.nl/phd/`

Contact: `snellen@strw.leidenuniv.nl`

Project Manager for the Upgrade to the CRIRES Spectrograph

Artie Hatzes

Thüringer Landessternwarte Tautenburg, Sternwarte 5, D-07778, Tautenburg, 15 November 2011

The Thüringer Landessternwarte Tautenburg seeks to fill a fixed-term position for Project Manager as part of a BMBF funded project for an upgrade to CRIRES, a high resolution infrared echelle spectrogaph mounted on the VLT. The Project Manager will: 1) Provide managerial leadership and oversight among the consortium partners for the design and construction of the upgrade; 2) Work closely with ESO who will have leadership over the entire upgrade project; 3) Will be responsible for setting schedules and the time line for design reviews; 4) Ensure that resources of the project are used effectively; 5) Prepare the appropriate documents related to the upgrade; And 6) ensure the successful commissioning of the instrument on the VLT at Paranal. The requirements are an advanced degree in Physics, Astronomy, or Engineering. It is prefereed that applicants with astronomy and physics degrees have a strong engineering and instrumental background. Experience in infrared spectroscopy is strongly desired as well as an ability to lead a multi-disciplinary team of engineers, optical designers, machinists, and scientists
The appointment will be for 2 years with a possibility for a third year pending the successful completion of all design reviews, and final approval by ESO. The salary is based on the German public service scale (TV-L). Applicants should send a Curriculum Vitae, statement of experience and the names of two people who can be contacted for references electronically to: artie@tls-tautenburg.de. All applications received by 15. November 2011 will be given full consideration. Applications will be accepted until a suitable candidate is found.

Download/Website: `http://www.tlstautenburg.de/tls_d.php?category=jobs_d/`

Contact: `artie@tls-tautenburg.de`

4 Conference announcements

Pro-Am Conference on Stellar Astrophysics: Double stars, pulsating stars, exoplanets, supernovae

L. Corp
Andromède 4A, Rodez, France

Onet le Château, Rodez, France, 28 September – 1st October 2012

CAPAS, Amateur-Professionnal Congress - Stellar Astrophysics, aims to present new discoveries and new technics in various subjects related to stellar astrophysics and in which amateur astronomers might be involved. Professional and amateur astronomers, as well as international associations are expected to participate and share their findings. For the first time, double star astronomers and variable star astronomers will be able to share their views during these 4 days. To be noticed: a visit of an historical site will be organised as well as 2 open conferences which will allow to present the work of the attendees to the public and give the opportunity to the audience to meet astronomers. CAPAS Congress is open to anybody. daily fees are proposed in order to allow to attend only to a part of the congress for those willing to.

Download/Website: `http://rr-lyr.ast.obs-mip.fr/capas2012/`

Contact: `capas-2012@orange.fr`

STFC graduate course: Exoplanets and their host stars

S. Aigrain[1]*, W. J. Chaplin*[2]
[1] Department of Physics, University of Oxford
[2] School of Physics and Astronomy, University of Birmingham

St Anne's College, Oxford, 12–16 March 2012

Last chance to register: Applications close on 18 November 2011!
We are entering a golden era for exoplanet science and asteroseismology, driven by new satellite and telescope observations of unprecedented quality and scope. The discovery and characterisation of exoplanets is one of the most active areas in modern astronomy, and has seen tremendous growth in the UK in the past decade. Transiting planets in particular offer unique opportunities to study the interior structures, compositions and atmospheres of a vast range of exoplanets. Understanding stars is clearly of central importance to astrophysics as a whole, but the synergy is particularly potent for exoplanets: in many cases, it is our knowledge of the host star properties which currently limits the detectability and characterization of planets.

This 3.5 day residential course is aimed primarily at graduate students studying exoplanets, asteroseismology and/or stellar activity. The programme consists of lectures by leading UK experts, providing an overview of the key scientific questions addressed by these areas and their mutual synergies, and team projects providing a hands-on introduction to the most important data analysis and modelling techniques using data from state-of-the-art facilities. The course is limited to a maximum of 30 students, and all participants must apply before Friday 18/11/2011. STFC-funded students have priority but other graduate students and young postdocs interested in exoplanets and asteroseismology are welcome to apply. STFC will cover the full cost of the course (including travel and subsistence) for STFC-funded graduate students. See website for instructions on how to apply.

Download/Website: `http://physics.ox.ac.uk/EAHS12`

Contact: `vfw@astro.ox.ac.uk`

NASA ExoPAG (Exoplanet Exploration Program Analysis Group)

J. Kasting
Dept. of Geosciences, Penn State University, USA

Austin Convention Center, 500 East Cesar Chavez Street, Austin, TX 78701, USA , 7– 8 January 2012

Dear Friends of Exoplanet Research,
NASA's ExoPAG (Exoplanet Exploration Program Analysis Group) will be holding a meeting on Sat./Sun., Jan. 7-8, just prior to the American Astronomical Society meeting in Austin, TX. Topics of interest will include plans for a future, space-based, flagship-class, direct imaging mission, along with discussion of possible Probe-class ($< \$1$B) missions that might be proposed in the next decade if money for flagships is not available. The ExoPAG would also like to broaden the discussion to include other ways in which NASA might facilitate exoplanet research over the next few years. To this end, we invite suggestions for topics and/or speakers at our January meeting. Feel free to suggest yourself as a speaker if you have interesting ideas that you would like to share. The meeting will run for two full days, so there should be plenty of time for both presentations and discussion. We look forward to seeing you in Austin!

Download/Website: `http://exep.jpl.nasa.gov/exopag/exopag5/`

Contact: `jfk4@psu.edu`

Science with a Wide-field Infrared Telescope in Space *and* The 16th International Conference on Gravitational Microlensing

Caltech

Pasadena, CA, February 13-17, 2012

Please join us for this two-part, week long conference that capitalizes on the synergy between the top ranked space-based recommendation of the Astronomy and Astrophysics Decadal Survey report and the burgeoning field of microlensing. The conference will begin with two and a half days (Feb. 13-15) focusing on the scientific potential of observations with a wide-field infrared survey telescope in space to probe the nature of dark energy, conduct searches for exoplanets using gravitational microlensing, and as a general facility for wide-area surveys. Starting with a joint session on Wednesday afternoon, the second half of the week (Feb. 15-17) will be the 16th in a series of conferences to discuss the latest results from microlensing searches and the perspectives opened by new methodologies and observational and computational facilities.

Important Dates

- Dec, 6, 2011: Abstract submission deadline
- Dec, 13, 2011: Early on-line registration ends
- Jan. 12, 2012: Hotel Registration deadline to be eligible for group rate
- Jan. 20, 2012: Final announcement: decisions on contributed talks; final agenda published
- Jan. 31, 2012: On-line registration closed
- Feb. 13-15, 2012: Science with a Wide-field Infrared Telescope in Space
- Feb. 15-17, 2012: 16th International Conference on Gravitational Microlensing

This meeting is being hosted by NASA, the Infrared Processing and Analysis Center (IPAC) at the California Institute of Technology, the Jet Propulsion Laboratory (JPL), and the Goddard Space Flight Center (GSFC). It will take place at the Pasadena Hilton. Registration, on-line abstract submission, hotel booking links, and more information can be found on the conference website.

Download/Website: `http://ipac.caltech.edu/wfir2012/`

Contact: `wfir2012@ipac.caltech.edu`

5 As seen on astro-ph

The following list contains all the entries relating to exoplanets that we spotted on astro-ph during November 2011. If you see any that we missed, please let us know and we'll include them in the next issue.

Exoplanets

astro-ph/1110.0059: **A Possible Substellar Companion to the Intermediate-mass Giant HD 175679** by *Liang Wang, Bun'ei Sato, Gang Zhao et al.*

astro-ph/1110.0820: **Kepler 18-b, c, and d: A System Of Three Planets Confirmed by Transit Timing Variations, Lightcurve Validation, Spitzer Photometry and Radial Velocity Measurements** by *William D.Cochran, Daniel C. Fabrycky, Guillermo Torres et al.*

astro-ph/1110.1092: **Stellar, brown dwarf and multiple star properties from a radiation hydrodynamical simulation of star cluster formation** by *Matthew R. Bate*

astro-ph/1110.1174: **Searching for faint companions with VLTI/PIONIER. I. Method and first results** by *Olivier Absil, Jean-Baptiste Le Bouquin, Jean-Philippe Berger et al.*

astro-ph/1110.1288: **Probing Substellar Companions of AGB Stars through Spirals and Arcs** by *Hyosun Kim, Ronald E. Taam*

astro-ph/1110.1340: **Reconstructing the photometric light curves of Earth as a planet along its history** by *Esther Sanroma, Enric Palle*

astro-ph/1110.1382: **Orbital Motion of HR 8799 b,c, d using Hubble Space Telescope data from 1998: Constraints on Inclination, Eccentricity and Stability** by *Remi Soummer, J. Brendan Hagan, Laurent Pueyo et al.*

astro-ph/1110.1384: **Non-Detection of the Putative Substellar Companion to HD 149382** by *Jackson M. Norris, Jason T. Wright, Richard A. Wade et al.*

astro-ph/1110.1639: **Substellar Objects in Nearby Young Clusters (SONYC) IV: A census of very low mass objects in NGC1333** by *Aleks Scholz, Koraljka Muzic, Vincent Geers et al.*

astro-ph/1110.1640: **Substellar Objects in Nearby Young Clusters (SONYC) V: New brown dwarfs in rho Ophiuchi** by *KoraljkaMuzic, Alexander Scholz, Vincent C. Geers et al.*

astro-ph/1110.1644: **Super-Eccentric Migrating Jupiters** by *Aristotle Socrates, Boaz Katz, Subo Dong et al.*

astro-ph/1110.1774: **Water Fractions in Extrasolar Planetesimals** by *M. Jura, S. Xu*

astro-ph/1110.2384: **Planetary transit candidates in the CoRoT LRa01 field** by *L. Carone, D. Gandolfi, J. Cabrera et al.*

astro-ph/1110.2426: **Compositions of Hot Super-Earth Atmospheres: exploring Kepler Candidates** by *Y. Miguel, L. Kaltenegger, B. Fegley Jr et al.*

astro-ph/1110.2542: **Revisiting the proposed planetary system orbiting the eclipsing polar HU Aquarii** by *Robert A. Wittenmyer, J.A. Horner, J.P. Marshall et al.*

astro-ph/1110.2658: **How terrestrial planets traverse spin-orbit resonances: A camel goes through a needle's eye** by *Valeri V. Makarov*

astro-ph/1110.2793: **A photochemical model for the carbon-rich planet WASP-12b** by *Ravi kumar Kopparapu, James F. Kasting, Kevin J. Zahnle*

astro-ph/1110.2934: **Optimal Estimation Retrievals of the Atmospheric Structure and Composition of HD 189733b from Secondary Eclipse Spectroscopy** by *Jae-Min Lee, Leigh N. Fletcher, Patrick G. J. Irwin*

astro-ph/1110.3066: **Mass-Radius Relationships for Exoplanets II: Grueneisen Equation of State for Ammonia** by *Damian C. swift*

astro-ph/1110.3087: **Thermal phase curves of non-transiting terrestrial exoplanets 2. Characterizing airless planets** by *A.S. Maurin, F. Selsis, F. Hersant et al.*

astro-ph/1110.3160: **High spatial resolution imaging of the star with a transiting planet WASP-33** by *Andy Moya, Herve Bouy, Franck Marchis et al.*

astro-ph/1110.3510: **Detection Of KOI-13.01 Using The Photometric Orbit** by *Avi Shporer, Jon M. Jenkins, Jason F. Rowe etal.*

astro-ph/1110.3512: **Kepler KOI-13.01 - Detection of beaming and ellipsoidal modulations pointing to a massive hot Jupiter** by *T. Mazeh, G. Nachmani, G. Sokol et al.*

astro-ph/1110.3514: **Measurement of the Spin-Orbit Misalignment of KOI-13.01 from its Gravity-Darkened Kepler Transit Lightcurve** by *Jason W. Barnes, Ethan Linscott, Avi Shporer et al.*

astro-ph/1110.3544: **Modeling the Infrared Spectrum of the Earth-Moon System: Implications for the Detection and Characterization of Earthlike Extrasolar Planets and their Moonlike Companions** by *Tyler D. Robinson*

astro-ph/1110.3744: **Modeling the Infrared Spectrum of the Earth-Moon System: Implications for the Detection and Characterization of Earthlike Extrasolar Planets and their Moonlike Companions** by *Tyler D. Robinson*

astro-ph/1110.3782: **Light and Life: Exotic Photosynthesis in Binary Star Systems** by *J. T. O'Malley-James, J. A. Raven, C. S. Cockell et al.*

astro-ph/1110.3808: **LkCa 15: A Young Exoplanet Caught at Formation?** by *Adam L. Kraus, Michael J. Ireland*

astro-ph/1110.4152: **Water in Star and Planet Forming Regions** by *Edwin A. Bergin, Ewine F. van Dishoeck*

astro-ph/1110.4166: **A Hot Gap Around Jupiter's Orbit in the Solar Nebula** by *N. J. Turner, M. Choukroun, J. Castillo-Rogez et al.*

astro-ph/1110.4172: **Spitzer Evidence for a Late Heavy Bombardment and the Formation of Urelites in eta Corvi at 1 Gyr** by *C. M. Lisse, M. C. Wyatt, C. H. Chen et al.*

astro-ph/1110.4377: **The Impact of Circumplantary Jets on Transit Spectra and Timing Offsets for Hot-Jupiters** by *Ian Dobbs-Dixon, Eric Agol, Adam Burrows*

astro-ph/1110.4385: **Vetting Kepler Planet Candidates with Multi-Color Photometry from the GTC: Identification of an Eclipsing Binary Star Near KOI 565** by *Knicole D. Colon, Eric B. Ford et al.*

astro-ph/1110.4525: **Suppression of the water ice and snow albedo feedback on planets orbiting red dwarf stars and the subsequent widening of the habitable zone** by *M Joshi, R Haberle et al.*

astro-ph/1110.4565: **Tidal dissipation in multi-planet systems and constraints to orbit-fitting** by *Jacques Laskar, Gwenael Boue, Alexandre C. M. Correia*

astro-ph/1110.4783: **Improved precision on the radius of the nearby super-Earth 55 Cnc e** by *M. Gillon, B.-O. Demory, B.Benneke et al.*

astro-ph/1110.4392: **Multiple-PlanetScattering and the Origin of Hot Jupiters** by *C. Beauge, D. Nesvorny*

astro-ph/1110.5042: **On the Migration of Jupiter and Saturn: Constraints from Linear Models of Secular Resonant Coupling with the Terrestrial Planets** by *Craig B. Agnor, D.N.C. Lin*

astro-ph/1110.5313: **WASP-36b: A new transiting planet around a metal-poor G-dwarf, and an analysis of correlated noise in transit light curves** by *A. M. S. Smith, D. R. Anderson, A. Collier Cameron et al.*

astro-ph/1110.5336: **Spitzer Infrared Observations and Independent Validation of the Transiting Super-Earth CoRoT-7b** by *Francois Fressin, Guillermo Torres, Frederic Pont et al.*

astro-ph/1110.5462: **SOPHIE velocimetry of Kepler transit candidates. V. The three hot Jupiters KOI-135b, KOI-204b andKOI-203b (alias Kepler-17b)** by *A. S. Bonomo, G. Hebrard, A. Santern et al.*

astro-ph/1110.5567: **The effects of snowlines on C/O in planetary atmospheres** by *Karin I. Oberg, Ruth Murray-Clay, Edwin A. Bergin*

astro-ph/1110.5750: **Corrigendum to "The upper atmosphere of the exoplanet HD209458b revealed by the sodium D lines: Temperature-pressure profile, ionization layer and thermosphere" [2011, A&A, 527, A110]** by *A. Vidal-Madjar, C. M. Huitson, A. Lecavelier des Etangs et al.*

astro-ph/1110.5840: **Optimizing exoplanet transit searches around low-mass stars with inclination constraints** by *E. Herrero, I. Ribas, C. Jordi et al*

astro-ph/1110.5901: **Analytic and numerical models of the 3D multipolar magnetospheres of pre-main sequence stars** by *S. G. Gregory, J.-F. Donati*

astro-ph/1110.5911: **55 Cancri: A Coplanar Planetary System that is Likely Misaligned with its Star** by *Nathan A. Kaib, Sean N. Raymond, Martin J. Duncan*

astro-ph/1110.5912: **Qatar-2: A K dwarf orbited by a transiting hot Jupiter and a more massive companion in an outer orbit** by *Marta L. Bryan, Khalid A. Alsubai, David W. Latham et al.*

astro-ph/1110.6136: **XO-2b: a Prograde Planet with a Negligible Eccentricity, and an Additional Radial Velocity Variation** by *Norio Narita, Teruyuki Hirano, Bun'ei Sato et al.*

astro-ph/1110.6180: **Lack of Inflated Radii for Kepler Giant Planet Candidates Receiving Modest Stellar Irradiation** by *Brice-Olivier Demory, Sara Seager et al.*

Disks

astro-ph/1110.1282: **Dependence of aplanet's chaotic zone on particle eccentricity: the shape of debris disc inner edges** by *Alexander J. Mustill, Mark C. Wyatt*

astro-ph/1110.2095: **A 30 AU radius CO gas hole in the disk around the Herbig Ae star Oph IRS 48** by *Joanna M. Brown, Gregory J. Herczeg, Klaus M. Pontoppidan et al.*

astro-ph/1110.2488: **Images of the Extended Outer Regions of the Debris Ring Around HR 4796 A** by *C. Thalmann, M. Janson, E. Buenzli et al.*

astro-ph/1110.3648: **A new code to study structures in collisionally active, perturbed debris discs. Application to binaries** by *Philippe Thebault*

astro-ph/1110.4189: **Rapid Mid-Infrared Variability in Protostellar Disks** by *Te T. Ke, Hao Huang, Douglas N.C. Lin*

astro-ph/1110.4219: **Dust discs around intermediate mass and Sun-like stars in the 16 Myr old NGC 1960 open cluster** by *R. Smith, R.D. Jeffries*

astro-ph/1110.4551: **Density waves in debris discs and galactic nuclei** by *Mir Abbas Jalali, Scott Tremaine*

astro-ph/1110.4600: **Detection of the Water Reservoir in a Forming Planetary System** by *Michiel R. Hogerheijde, Edwin A. Bergin, Christian Brinc et al.*

Instrumentation and Techniques

astro-ph/1110.1034: **A simple method to estimate radial velocity variations due to stellar activity using photometry** by *S. Aigrain, F. Pont, S. Zucker*

astro-ph/1110.2256: **Higher-precision radial velocity measurements with the SOPHIE spectrograph using octagonal-section fibers** by *S. Perruchot, F. Bouchy, B. Chazelas, et al.*

astro-ph/1110.2621: **A high dynamic-range instrument for SPICA for coronagraphic observation of exoplanets and monitoring of transiting exoplanets** by *K. Enya, L. Abe, S. Takeuchi et al.*

astro-ph/1110.4917: **MESS (Multi-purpose Exoplanet Simulation System): A Monte Carlo tool for the statistical analysis and prediction of exoplanets search results** by *M. Bonavita, G. Chauvin, S. Desidera et al.*