ExoPlanet News
An Electronic Newsletter

No. 59, May 2nd, 2013

Editor: Andrew J. Norton
Department of Physical Sciences, The Open University, Milton Keynes MK7 6AA, UK
exoplanet@open.ac.uk, http://exoplanet.open.ac.uk/

Contents

1 Editorial **2**

2 Abstracts of refereed papers **2**
– Triggering Collapse of the Presolar Dense Cloud Core and Injecting Short-Lived Radioisotopes with a Shock Wave. II. Varied Shock Wave and Cloud Core Parameters *Boss & Keiser* 2
– The GAPS Programme with HARPS-N at TNG. I: Observations of the Rossiter-McLaughlin effect and characterisation of the transiting system Qatar-1 *Covino et al.* 3
– BEER analysis of *Kepler* and CoRoT light curves: I. Discovery of a hot Jupiter with superrotation evidence in *Kepler* data *Faigler et al.* 5
– Effect of Metallicity on the Evolution of the Habitable Zone from the Pre-Main Sequence to the Asymptotic Giant Branch and the Search for Life *Danchi & Lopez* 6
– A self-gravitating disc around L1527 IRS? *Forgan & Rice* 6
– Dynamical Effects on the Habitable Zone for Earth-like Exomoons *Forgan & Kipping* 7
– Towards a Population Synthesis Model of Objects formed by Self-Gravitating Disc Fragmentation and Tidal Downsizing *Forgan & Rice* 8
– Absorbing gas around the WASP-12 planetary system *Fossati et al.* 9
– KOI-200 b and KOI-889 b: two transiting exoplanets detected and characterized with *Kepler*, SOPHIE and HARPS-N *G. Hébrard et al.* 10
– Resolving the gap and AU-scale asymmetries in the pre-transitional disk of V1247 Orionis *Kraus et al.* 11
– Dynamical analysis of the Gliese-876 Laplace resonance *Martí, Giuppone & Beaugé* 13
– Magnetodynamo Lifetimes for Rocky, Earth-Mass Exoplanets with Contrasting Mantle Convection Regimes *van Summeren, Gaidos & Conrad* 14

3 Abstracts of theses **15**
– A Stellar Variability Survey with STEREO *Wraight* 15

4 Jobs and Positions **16**
– Infrared Astronomer/Instrumentation Scientist *Institute for Astronomy, ETH Zurich* 16
– EtaEarth PDRA specializing in Circumbinary Planets *Don Pollacco, Stephane Udry & Chris Watson* . 17
– Senior research fellow at Lund Observatory *Lund University* 18

5 Conference announcements **19**
– PLATO 2.0 Science Workshop *ESTEC, Noordwijk, The Netherlands* 19
– NEAT 2013 Simulation Workshop *Institut de Planétologie et d'Astrophysique de Grenoble, France* . . 20
– EChO Open Science Workshop *ESTEC, Noordwijk, Netherlands* 21
– European Planetary Science Congress *University College London, London, UK* 22
– Exoclimes III - the Diversity of Planetary Atmospheres *Davos, Switzerland* 23

6 As seen on astro-ph **23**

1 Editorial

Welcome to the fifty ninth edition of ExoPlanet News. This month sees a return to the usual selection of enticing job adverts and interesting conferences that were missing from last month's edition – it's particularly encouraging to see a set of meetings planned for each of the proposed missions: PLATO 2.0, NEAT and EChO.

The next edition of the newsletter is planned for early June 2013, so please send anything relevant over the next few weeks 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
The Open University

2 Abstracts of refereed papers

Triggering Collapse of the Presolar Dense Cloud Core and Injecting Short-Lived Radioisotopes with a Shock Wave. II. Varied Shock Wave and Cloud Core Parameters

Alan P. Boss and Sandra A. Keiser
DTM, Carnegie Institution, Washington, DC, USA

Astrophysical Journal, in press

A variety of stellar sources have been proposed for the origin of the short-lived radioisotopes that existed at the time of the formation of the earliest Solar System solids, including Type II supernovae, AGB and super-AGB stars, and Wolf-Rayet star winds. Our previous adaptive mesh hydrodynamics models with the FLASH2.5 code have shown which combinations of shock wave parameters are able to simultaneously trigger the gravitational collapse of a target dense cloud core and inject significant amounts of shock wave gas and dust, showing that thin supernova shocks may be uniquely suited for the task. However, recent meteoritical studies have weakened the case for a direct supernova injection to the presolar cloud, motivating us to re-examine a wider range of shock wave and cloud core parameters, including rotation, in order to better estimate the injection efficiencies for a variety of stellar sources. We find that supernova shocks remain as the most promising stellar source, though planetary nebulae resulting from AGB star evolution cannot be conclusively ruled out. Wolf-Rayet star winds, however, are likely to lead to cloud core shredding, rather than to collapse. Injection efficiencies can be increased when the cloud is rotating about an axis aligned with the direction of the shock wave, by as much as a factor of ~ 10. The amount of gas and dust accreted from the post-shock wind can exceed that injected from the shock wave, with implications for the isotopic abundances expected for a supernova source.

Download/Website: `http://www.dtm.ciw.edu/users/boss/ftp/triggerii.pdf`

Contact: `boss@dtm.ciw.edu`

The GAPS Programme with HARPS-N at TNG. I: Observations of the Rossiter-McLaughlin effect and characterisation of the transiting system Qatar-1

E. Covino[1], *M. Esposito*[2,19], *M. Barbieri*[3], *L. Mancini*[4], *V. Nascimbeni*[3,5], *R. Claudi*[5], *S. Desidera*[5], *R. Gratton*[5], *A. F. Lanza*[6], *A. Sozzetti*[7], *K. Biazzo*[1,6], *L. Affer*[8] , *D. Gandolfi*[9], *U. Munari*[5], *I. Pagano*[6], *A. S. Bonomo*[7], *A. Collier Cameron*[10], *G. Hébrard* [21], *A. Maggio*[8], *S. Messina*[6], *G. Micela*[8], *E. Molinari*[11,12], *F. Pepe*[13], *G. Piotto*[3,5], *I. Ribas*[14], *N. C. Santos*[15,16], *J. Southworth*[17], *E. Shkolnik*[23], *A. H.M.J. Triaud*[13,24], *L. Bedin*[5], *S. Benatti* [5], *C. Boccato*[5], *M. Bonavita*[5], *F. Borsa*[20,26], *L. Borsato*[3], *D. Brown*[10], *E. Carolo*[3] , *S. Ciceri*[4], *R. Cosentino*[11], *M. Damasso*[3,27,7], *F. Faedi*[18], *A. F. Martínez Fiorenzano*[11], *D.W. Latham*[25], *C. Lovis*[13], *C. Mordasini*[4], *N. Nikolov*[4], *E. Poretti*[20], *M. Rainer*[20], *R. Rebolo López*[2,19], *G. Scandariato*[6], *R. Silvotti*[7], *R. Smareglia*[22], *J. M. Alcalá*[1], *A. Cunial*[3], *L. Di Fabrizio*[2], *M.P. Di Mauro*[28], *P. Giacobbe*[7,27], *V. Granata*[3], *A. Harutyunyan*[2], *C. Knapic*[22], *M. Lattanzi*[7], *G. Leto*[6] , *G. Lodato*[29], *L. Malavolta*[3], *F. Marzari*[3], *M. Molinaro*[22], *D. Nardiello*[3], *M. Pedani*[2], *L. Prisinzano*[8], *D. Turrini*[28]

[1] INAF – Osservatorio Astronomico di Capodimonte, via Moiariello, 16, 80131 Naples, Italy
[2] Instituto de Astrofísica de Canarias, C/ Vía Láctea, s/n, E38205 - La Laguna (Tenerife), Spain
[3] Dipartimento di Fisica e Astronomia Galileo Galilei, Università di Padova, Vicolo dell'Osservatorio 2, I-35122, Padova, Italy
[4] Max-Planck-Institut für Astronomie, Königstuhl 17, D-69117 Heidelberg, Germany
[5] INAF – Osservatorio Astronomico di Padova, Vicolo dell'Osservatorio 5, 35122 Padova, Italy
[6] INAF – Osservatorio Astrofisico di Catania, via S. Sofia 78, 95123 Catania, Italy
[7] INAF – Osservatorio Astrofisico di Torino, Via Osservatorio 20, I-10025, Pino Torinese, Italy
[8] INAF – Osservatorio Astronomico di Palermo, Piazza del Parlamento, Italy 1, I-90134, Palermo, Italy
[9] Research and Scientific Support Department, ESTEC/ESA, PO Box 299 2200 AG Noordwijk, The Netherlands
[10] SUPA, School of Physics and Astronomy, University of St. Andrews, North Haugh, Fife KY16 9SS, UK
[11] Fundación Galileo Galilei - INAF, Rambla José Ana Fernandez Pérez, 7 38712 Breña Baja, TF - Spain
[12] INAF – IASF Milano, via Bassini 15, I-20133 Milano, Italy
[13] Observatoire Astronomique de l'Universite de Geneve, 51 ch. des Maillettes - Sauverny, 1290, Versoix, Switzerland
[14] Institut de Ciències de l'Espai (CSIC-IEEC), Campus UAB, Facultat de Ciències,Torre C5, 2a pl, 08193 Bellaterra, E
[15] Centro de Astrofísica, Universidade do Porto, Rua das Estrelas, 4150-762 Porto, Portugal
[16] Departamento de Física e Astronomia, Faculdade de Ciências, Universidade do Porto, Portugal
[17] Astrophysics Group, Keele University, Staffordshire, ST5 5BG, UK
[18] Department of Physics, University of Warwick, Gibbet Hill Road, Coventry CV4 7AL, UK
[19] Departamento de Astrofísica, Universidad de La Laguna, Avda. Astrofísico F. Sánchez, s/n 38206 La Laguna, TF - Spain
[20] INAF – Osservatorio Astronomico di Brera, Via E. Bianchi 46, 23807, Merate (LC), Italy
[21] Institut d'Astrophysique de Paris, UMR7095 CNRS, Université Pierre & Marie Curie, 98bis bvd Arago, 75014 - France
[22] INAF – Osservatorio Astronomico di Trieste, Via Tiepolo 11, 34143 Trieste Italy
[23] Lowell Observatory, 1400 W. Mars Hill Road, Flagstaff, AZ, USA 86001
[24] Kavli Institute for Astrophysics and Space Research, Massachusetts Institute of Technology, Cambridge, MA 02139, USA
[25] Harvard-Smithsonian Center for Astrophysics, 60 Garden Street, Cambridge, MA 02138, USA
[26] Università dell'Insubria - Dipartimento di Scienza e Alta Tecnologia, Via Valleggio 11, 22100 Como, Italy
[27] Osservatorio Astronomico della Regione Autonoma Valle d'Aosta, Fraz. Lignan 39, 11020, Nus (Aosta), Italy
[28] INAF Istituto di Fisica e Planetologia Spaziali, via Fosso del Cavaliere 100, 00133, Roma Italy
[29] Dipartimento di Fisica dell'Universitá degli studi di Milano, via Celoria, 16, 20133 Milano Italy

Astronomy & Astrophysics, in press (arXiv:1304.0005)

Context: Our understanding of the formation and evolution of planetary systems is still fragmentary becuase most of the current data provide limited information about the orbital structure and dynamics of these systems. The knowledge of the orbital properties for a variety of systems and at different ages yields information on planet migration and on star-planet tidal interaction mechanisms.
Aims: In this context, a long-term, multi-purpose, observational programme has started with HARPS-N at TNG and aims to characterise the global architectural properties of exoplanetary systems. The goal of this first paper is to fully characterise the orbital properties of the transiting system Qatar-1 as well as the physical properties of the star and the planet.
Methods: We exploit HARPS-N high-precision radial velocity measurements obtained during a transit to measure the Rossiter-McLaughlin effect in the Qatar-1 system, and out-of-transit measurements to redetermine the spectroscopic orbit. New photometric-transit light-curves were analysed and a spectroscopic characterisation of the host star atmospheric parameters was performed based on various methods (line equivalent width ratios, spectral synthesis, spectral energy distribution).

Results: We achieved a significant improvement in the accuracy of the orbital parameters and derived the spin-orbit alignment of the system; this information, combined with the spectroscopic determination of the host star properties (rotation, $T_{\rm eff}$, $\log g$, metallicity), allows us to derive the fundamental physical parameters for star and planet (masses and radii). The orbital solution for the Qatar-1 system is consistent with a circular orbit and the system presents a sky-projected obliquity of $\lambda = -8.4 \pm 7.1$ deg. The planet, with a mass of $1.33 \pm 0.05\,{\rm M_J}$, is found to be significantly more massive than previously reported. The host star is confirmed to be metal-rich ([Fe/H]= 0.20±0.10) and slowly rotating (vsin $I = 1.7 \pm 0.3\,{\rm km\,s^{-1}}$), though moderately active, as indicated by the strong chromospheric emission in the CaII H&K line cores ($\log {\rm R}'_{\rm HK} \approx -4.60$).
Conclusions: We find that the system is well aligned and fits well within the general λ versus $T_{\rm eff}$ trend. We can definitely rule out any significant orbital eccentricity. The evolutionary status of the system is inferred based on gyrochronology, and the present orbital configuration and timescale for orbital decay are discussed in terms of star-planet tidal interactions.

Download/Website: `http://arxiv.org/abs/1304.0005`

Contact: `covino@oacn.inaf.it`

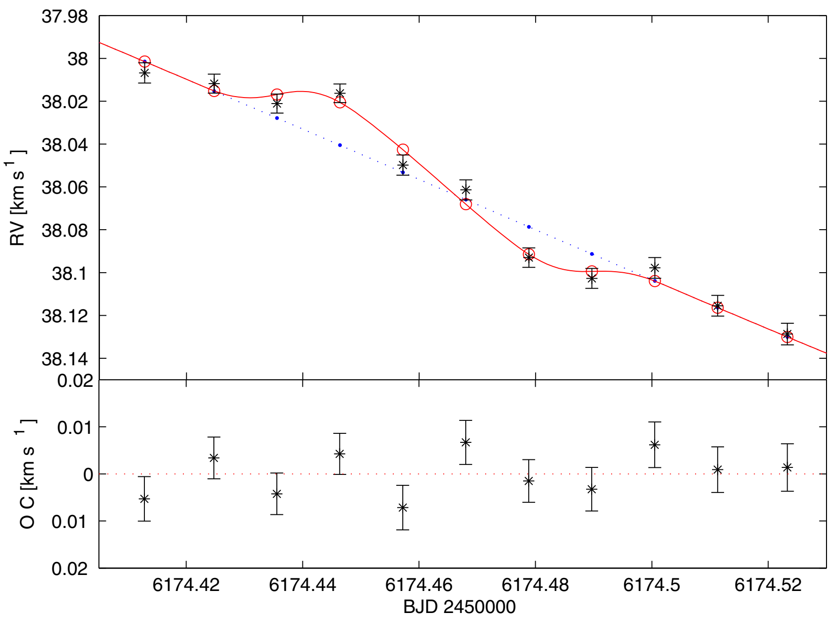

Figure 1: (Covino et al.) Rossiter-McLaughlin effect in the Qatar-1 system: RV measurements (black star symbols), best-fit solution (solid, red line), and computed RV values (red open circles), yielding the O$-$C beneath. The Keplerian radial velocity curve is drawn as a blue dotted line.

BEER analysis of *Kepler* and CoRoT light curves: I. Discovery of a hot Jupiter with superrotation evidence in *Kepler* data

S. Faigler[1], *L. Tal-Or*[1], *T. Mazeh*[1], *D. W. Latham*[2] *and L. A. Buchhave*[3]

[1] School of Physics and Astronomy, Raymond and Beverly Sackler Faculty of Exact Sciences, Tel Aviv University, Tel Aviv 69978, Israel
[2] Harvard-Smithsonian Center for Astrophysics, 60 Garden St., Cambridge, MA 02138
[3] Niels Bohr Institute, University of Copenhagen, DK-2100 Copenhagen, Denmark

The Astrophysical Journal, in press (arXiv:1304.6841)

We present the first case in which the BEER algorithm identified a hot Jupiter in the *Kepler* light curve, and its reality was confirmed by orbital solutions based on follow-up spectroscopy. The companion KIC 4570949b was identified by the BEER algorithm, which detected the BEaming (sometimes called Doppler boosting) effect together with the Ellipsoidal and Reflection/emission modulations (BEER), at an orbital period of 1.54 days, suggesting a planetary companion orbiting the 13.3 mag F star. Further investigation revealed that this star appeared in the *Kepler* eclipsing binary catalog with estimated primary and secondary eclipse depths of 5×10^{-3} and 1×10^{-4} respectively. Spectroscopic radial-velocity follow-up observations with TRES and SOPHIE confirmed KIC 4570949b as a transiting $2.0 \pm 0.26\ M_{\rm Jup}$ hot Jupiter. The mass of a transiting planet can be estimated from either the beaming or the ellipsoidal amplitude. The ellipsoidal-based mass estimate of KIC 4570949b is consistent with the spectroscopically measured mass while the beaming-based estimate is significantly inflated. We explain this apparent discrepancy as evidence for the superrotation phenomenon, which involves eastward displacement of the hottest atmospheric spot of a tidally-locked planet by an equatorial super-rotating jet stream. This phenomenon was previously observed only for HD 189733b in the infrared. We show that a phase shift of 10.3 ± 2.0 degrees of the planet reflection/emission modulation, due to superrotation, explains the apparently inflated beaming modulation, resolving the ellipsoidal/beaming amplitude discrepancy. KIC 4570949b is one of very few confirmed planets in the *Kepler* light curves that show BEER modulations and the first to show superrotation evidence in the *Kepler* band. Its discovery illustrates for the first time the ability of the BEER algorithm to detect short-period planets and brown dwarfs.

Download/Website: `http://arxiv.org/abs/1304.6841`

Contact: `simchonf@mail.tau.ac.il`

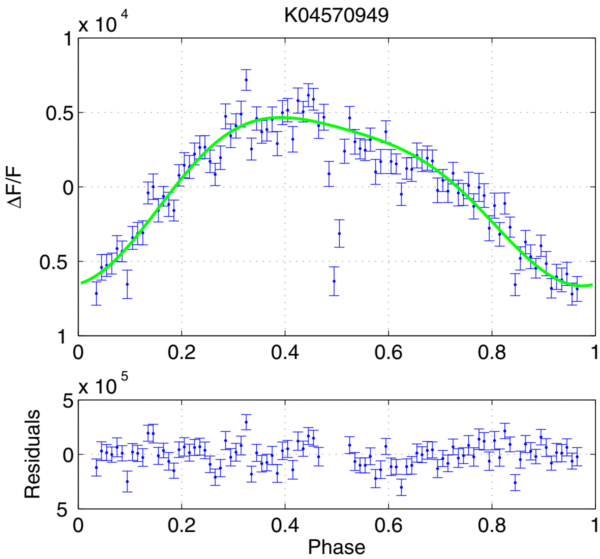

Figure 2: (Faigler et al.) The folded light curve of KIC 4570949 binned into 100 bins. The asymmetry of the phase modulation is explained mostly by a phase shift of the planet re-emission due to eastward displacement of the planet hottest atmospheric spot by an equatorial super-rotating jet stream. Only a a small part of this asymmetry can be explained by the beaming effect which is well estimated from spectroscopic radial-velocity measurements.

Effect of Metallicity on the Evolution of the Habitable Zone from the Pre-Main Sequence to the Asymptotic Giant Branch and the Search for Life

William C. Danchi[1], *Bruno Lopez*[2]

[1] Exoplanets and Stellar Astrophysics Laboratory, NASA Goddard Space Flight Center, Code 667, Greenbelt, MD 20771 USA
[2] Observatoire de la Côte d'Azur, Laboratoire Lagrange UMR 7293, BP 4229, F-06034 Nice Cedex 4, France

The Astrophysical Journal, in press (arXiv:1304.1464v1)

During the course of stellar evolution, the location and width of the habitable zone changes as the luminosity and radius of the star evolves. The duration of habitability for a planet located at a given distance from a star is greatly affected by the characteristics of the host star. A quantification of these effects can be used observationally in the search for life around nearby stars. The longer the duration of habitability, the more likely it is that life has evolved. The preparation of observational techniques aimed at detecting life would benefit from the scientific requirements deduced from the evolution of the habitable zone. We present a study of the evolution of the habitable zone around stars of 1.0, 1.5, and 2.0 $M_{\odot}$ for metallicities ranging from Z=0.0001 to Z=0.070. We also consider the evolution of the habitable zone from the pre-main sequence until the asymptotic giant branch is reached. We find that metallicity strongly affects the duration of the habitable zone for a planet as well as the distance from the host star where the duration is maximized. For a 1.0 $M_{\odot}$ star with near Solar metallicity, Z=0.017, the duration of the habitable zone is $>$10 Gyr at distances 1.2 to 2.0 AU from the star, whereas the duration is $>$20 Gyr for high metallicity stars (Z=0.070) at distances of 0.7 to 1.8 AU, and $\sim$4 Gyr at distances of 1.8 to 3.3 AU for low metallicity stars (Z=0.0001). Corresponding results have been obtained for stars of 1.5 and 2.0 solar masses.

Download/Website: `http://arxiv.org/abs/1304.1464v1`

Contact: `william.c.danchi@nasa.gov`

A self-gravitating disc around L1527 IRS?

D. Forgan, K. Rice

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

Monthly Notices of the Royal Astronomical Society, in press (arXiv:1304.7390)

Recent observations of the Class 0 protostar L1527 IRS have revealed a rotationally supported disc with an outer radius of at least 100 au. Measurements of the integrated flux at 870 μm suggest a disc mass that is too low for gravitational instability to govern angular momentum transport. However, if parts of the disc are optically thick at sub-mm wavelengths, the sub-mm fluxes will underestimate the disc mass, and the disc's actual mass may be substantially larger, potentially sufficient to be self-gravitating.
We investigate this possibility using simple self-gravitating disc models. To match the observed mass accretion rates requires a disc-to-star mass ratio of at least ~ 0.5, which produces sub-mm fluxes that are similar to those observed for L1527 IRS in the absence of irradiation from the envelope or central star. If irradiation is significant, then the predicted fluxes exceed the observed fluxes by around an order of magnitude. Our model also indicates that the stresses produced by the gravitational instability are low enough to prevent disc fragmentation.
As such, we conclude that observations do not rule out the possibility that the disc around L1527 IRS is self-gravitating, but it is more likely that despite being a very young system, this disc may already have left the self-gravitating phase.

Download/Website: `http://arxiv.org/abs/1304.7390`

Contact: `dhf@roe.ac.uk`

Dynamical Effects on the Habitable Zone for Earth-like Exomoons

D. Forgan[1], *D. Kipping*[2,3]

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

[2] Harvard-Smithsonian Centre for Astrophysics, Cambridge, Massachusetts 02138, USA

[3] Carl Sagan Fellow

Monthly Notices of the Royal Astronomical Society, in press (arXiv:1304.4377)

With the detection of extrasolar moons (exomoons) on the horizon, it is important to consider their potential for habitability. If we consider the circumstellar Habitable Zone (HZ, often described in terms of planet semi-major axis and orbital eccentricity), we can ask, "How does the HZ for an Earth-like exomoon differ from the HZ for an Earth-like exoplanet?"

For the first time, we use 1D latitudinal energy balance modelling to address this question. The model places an Earth-like exomoon in orbit around a Jupiter mass planet, which in turn orbits a Sun-like star. The exomoon's surface is decomposed into latitudinal strips, and the temperature of each strip is evolved under the action of stellar insolation, atmospheric cooling, heat diffusion, eclipses of the star by the planet, and tidal heating. We use this model to carry out two separate investigations.

In the first, four test cases are run to investigate in detail the dependence of the exomoon climate on orbital direction, orbital inclination, and on the frequency of stellar eclipse by the host planet. We find that lunar orbits which are retrograde to the planetary orbit exhibit greater climate variations than prograde orbits, with global mean temperatures around 0.1 K warmer due to the geometry of eclipses. If eclipses become frequent relative to the atmospheric thermal inertia timescale, climate oscillations become extremely small.

In the second investigation, we carry out an extensive parameter study, running the model many times to study the habitability of the exomoon in the 4-dimensional space composed of the planet semi-major axis and eccentricity, and the moon semi-major axis and eccentricity. We find that for zero moon eccentricity, frequent eclipses allow the moon to remain habitable in regions of high planet eccentricity, but tidal heating severely constrains habitability in the limit of high moon eccentricity, making the habitable zone a sensitive function of moon semi-major axis.

Download/Website: `http://arxiv.org/abs/1304.4377`

Contact: `dhf@roe.ac.uk`

Towards a Population Synthesis Model of Objects formed by Self-Gravitating Disc Fragmentation and Tidal Downsizing

D. Forgan, K. Rice
Scottish Universities Physics Alliance (SUPA), Institute for Astronomy, University of Edinburgh, Blackford Hill, Edinburgh, EH9 3HJ, Scotland, UK

Monthly Notices of the Royal Astronomical Society, in press (arXiv:1304.4377)

Recently, the gravitational instability (GI) model of giant planet and brown dwarf formation has been revisited and recast into what is often referred to as the “tidal downsizing” hypothesis. The fragmentation of self-gravitating protostellar discs into gravitationally bound embryos - with masses of a few to tens of Jupiter masses, at semi major axes above 30 - 40 au - is followed by a combination of grain sedimentation inside the embryo, radial migration towards the central star and tidal disruption of the embryo’s upper layers. The properties of the resultant object depends sensitively on the timescales upon which each process occurs. Therefore, GI followed by tidal downsizing can theoretically produce objects spanning a large mass range, from terrestrial planets to giant planets and brown dwarfs. Whether such objects can be formed in practice, and what proportions of the observed population they would represent, requires a more involved statistical analysis.
We present a simple population synthesis model of star and planet formation via GI and tidal downsizing. We couple a semi-analytic model of protostellar disc evolution to analytic calculations of fragmentation, initial embryo mass, grain growth and sedimentation, embryo migration and tidal disruption. While there are key pieces of physics yet to be incorporated, it represents a first step towards a mature statistical model of GI and tidal downsizing as a mode of star and planet formation.
We show results from four runs of the population synthesis model, varying the opacity law and the strength of migration, as well as investigating the effect of disc truncation during the fragmentation process. We find that a large fraction of disc fragments are completely destroyed by tidal disruption (typically forty percent of the initial population). The tidal downsizing process tends to prohibit low mass embryos reaching small semimajor axis. The majority of surviving objects are brown dwarfs without solid cores of any kind. Around forty percent of surviving objects form solid cores of order 5-10 Earth masses, and of this group a few do migrate to distances amenable to current exoplanet observations. Over a million disc fragments were simulated in this work, and only one resulted in the formation of a terrestrial planet (i.e. with a core mass of a few Earth masses and no gaseous envelope). These early results suggest that GI followed by tidal downsizing is not the principal mode of planet formation, but remains an excellent means of forming gas giant planets, brown dwarfs and low mass stars at large semimajor axes.

Download/Website: `http://arxiv.org/abs/1304.4978`

Contact: `dhf@roe.ac.uk`

Absorbing gas around the WASP-12 planetary system

L. Fossati[1,3]*, T.R. Ayres*[2]*, C.A. Haswell*[3]*, D. Bohlender*[4]*, O. Kochukhov*[5]*, L. Flöer*[1]

[1] Argelander-Institut für Astronomie der Universität Bonn, Auf dem Hügel 71, 53121, Bonn, Germany
[2] Center for Astrophysics and Space Astronomy, University of Colorado, 593 UCB, Boulder, CO 80309-0593, USA
[3] Department of Physics and Astronomy, Open University, Walton Hall, Milton Keynes MK7 6AA, UK
[4] Herzberg Institute of Astrophysics, National Research Council of Canada, 5071 West Saanich Road, Victoria, BC V9E 2E7, Canada
[5] Department of Physics and Astronomy, Uppsala University, SE-751 20, Uppsala, Sweden

Astrophysical Journal Letters, published (2013, ApJ, 766, L20)

Near-UV observations of the planet host star WASP-12 uncovered the apparent absence of the normally conspicuous core emission of the Mg2 h&k resonance lines. This anomaly could be due either to (1) a lack of stellar activity, which would be unprecedented for a solar-like star of the imputed age of WASP-12; or (2) extrinsic absorption, from the intervening interstellar medium (ISM) or from material within the WASP-12 system itself, presumably ablated from the extreme hot Jupiter WASP-12 b. HIRES archival spectra of the Ca2 H&K lines of WASP-12 show broad depressions in the line cores, deeper than those of other inactive and similarly distant stars and similar to WASP-12's Mg2 h&k line profiles. We took high resolution ESPaDOnS and FIES spectra of three early-type stars within 20′ of WASP-12 and at similar distances, which show the ISM column is insufficient to produce the broad Ca2 depression observed in WASP-12. The EBHIS H1 column density map supports and strengthens this conclusion. Extrinsic absorption by material local to the WASP-12 system is therefore the most likely cause of the line core anomalies. Gas escaping from the heavily irradiated planet could form a stable and thick circumstellar disk/cloud. The anomalously low stellar activity index ($\log R'_{HK}$) of WASP-12 is evidently a direct consequence of the extra core absorption, so similar HK index deficiencies might signal the presence of translucent circumstellar gas around other stars hosting evaporating planets.

Contact: `lfossati@astro.uni-bonn.de`

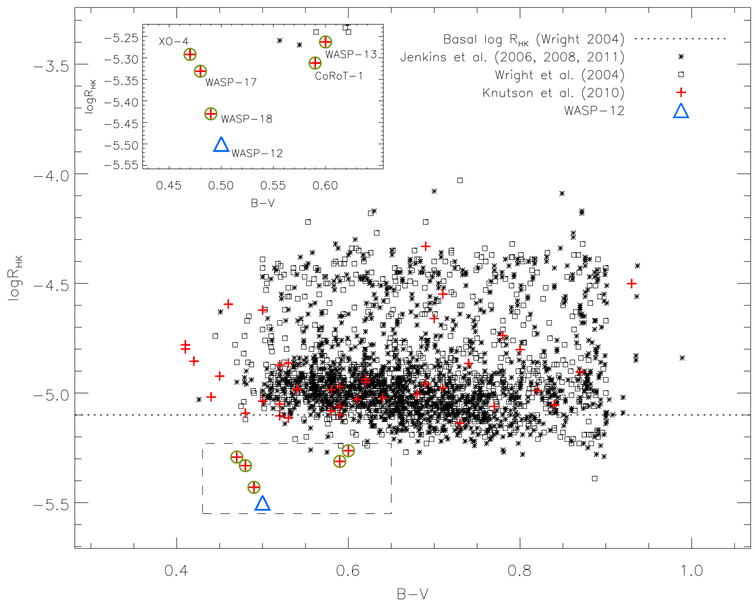

Figure 3: (Fossati et al.) WASP-12 (blue triangle) in $B-V$ vs. $\log R'_{HK}$ plane, compared with stars with $B-V < 1.0$ observed by Wright (2004) (squares), Jenkins et al.(2006; 2008; 2011) (stars), and Knutson et al. (2010) (red pluses). Color and activity indices adopted for WASP-12 are those given by Knutson et al. (2010). Circles indicate positions of planet hosting stars X0-4, CoRoT-1, WASP-13, WASP-17, and WASP-18. The dotted line indicates the minimum activity value within the Wright (2004) sample, accounting for contamination by subgiants Wright et al. (2004).

KOI-200 b and KOI-889 b: two transiting exoplanets detected and characterized with *Kepler*, SOPHIE and HARPS-N

G. Hébrard[1,2]*, J.-M. Almenara* [3]*, A. Santerne* [3,4]*, M. Deleuil* [3]*, C. Damiani* [3] *A. S. Bonomo* [3,5]*, F. Bouchy* [3]*, G. Bruno* [3]*, R. F. Díaz* [3]*, G. Montagnier* [1,2]*, C. Moutou* [3]

[1] Institut d'Astrophysique de Paris, UMR7095 CNRS, Université Pierre & Marie Curie, 98bis boulevard Arago, 75014 Paris, France
[2] Observatoire de Haute-Provence, CNRS/OAMP, 04870 Saint-Michel-l'Observatoire, France
[3] Aix Marseille Université, CNRS, LAM (Laboratoire d'Astrophysique de Marseille) UMR 7326, 13388, Marseille, France
[4] Centro de Astrofísica, Universidade do Porto, Rua das Estrelas, 4150-762 Porto, Portugal
[5] INAF - Osservatorio Astrofisico di Torino, Via Osservatorio 20, 10025 Pino Torinese, Italy

Astronomy & Astrophysics, in press (arXiv:1304.6002)

We present the detection and characterization of the two new transiting, close-in, giant extrasolar planets KOI-200 b and KOI-889 b. They were first identified by the *Kepler* team as promising candidates from photometry of the *Kepler* satellite, then we established their planetary nature thanks to the radial velocity follow-up jointly secured with the spectrographs SOPHIE and HARPS-N. Combined analyses of the whole datasets allow the two planetary systems to be characterized. The planet KOI-200 b has mass and radius of $0.68 \pm 0.09\ \mathrm{M_{Jup}}$ and $1.32 \pm 0.14\ \mathrm{R_{Jup}}$; it orbits in 7.34 days a F8V host star with mass and radius of $1.40^{+0.14}_{-0.11}\ \mathrm{M_\odot}$ and $1.51 \pm 0.14\ \mathrm{R_\odot}$. KOI-889 b is a massive planet with mass and radius of $9.9 \pm 0.5\ \mathrm{M_{Jup}}$ and $1.03 \pm 0.06\ \mathrm{R_{Jup}}$; it orbits in 8.88 days an active G8V star with a rotation period of 19.2 ± 0.3 days, and mass and radius of $0.88 \pm 0.06\ \mathrm{M_\odot}$ and $0.88 \pm 0.04\ \mathrm{R_\odot}$. Both planets lie on eccentric orbits and are located just at the frontier between regimes where the tides can explain circularization and where tidal effects are negligible. The two planets are among the first ones detected and characterized thanks to observations secured with HARPS-N, the new spectrograph recently mounted at the *Telescopio Nazionale Galileo*. These results illustrate the benefits that could be obtained from joint studies using two spectrographs as SOPHIE and HARPS-N.

Download/Website: `http://www.iap.fr/users/hebrard/KOI200-KOI889.pdf`

Contact: `hebrard@iap.fr`

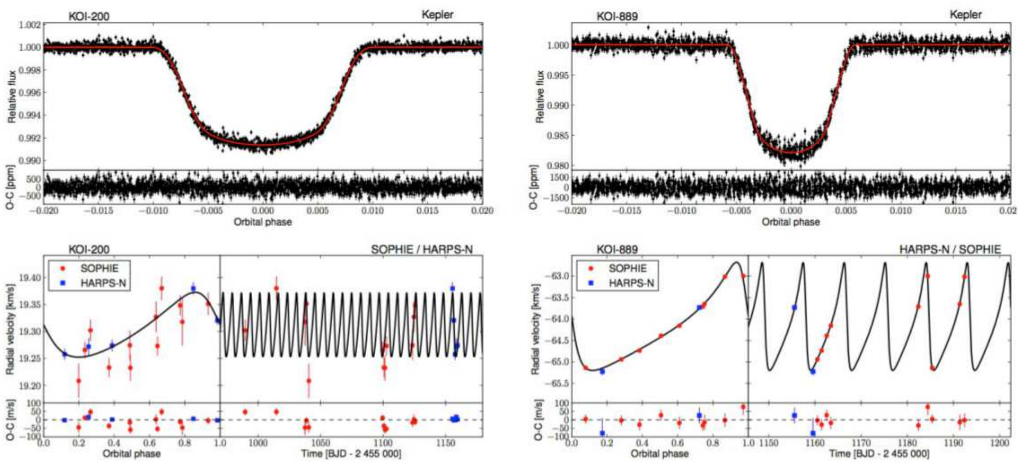

Figure 4: (Hebrard et al.) Data and best fit models for KOI-200 (left) and KOI-889 (right). *Upper panels: Kepler* phase-folded light-curve (black dots with 1-σ error bars) over-plotted with the best model (red line), and residuals. *Lower panels:* SOPHIE (red circles) and HARPS-N (blue squares) radial velocities and 1-σ error bars phase-folded to the orbital period of the planet (on left) or as function of time (on right) over-plotted with the best model (black line), and residuals.

Resolving the gap and AU-scale asymmetries in the pre-transitional disk of V1247 Orionis

Stefan Kraus[1,2,3], Michael J. Ireland[4], Michael L. Sitko[5,6,7], John D. Monnier[2], Nuria Calvet[2], Catherine Espaillat[1], Carol A. Grady[8], Tim J. Harries[3], Sebastian F. Hönig[9], Ray W. Russell[7,10], Jeremy R. Swearingen[5], Chelsea Werren[5], and David J. Wilner[1]

[1] Harvard-Smithsonian Center for Astrophysics, 60 Garden Street, MS-78, Cambridge, MA 02138, USA
[2] Department of Astronomy, University of Michigan, 918 Dennison Building, Ann Arbor, MI 48109, USA
[3] School of Physics, University of Exeter, Stocker Road, Exeter EX4 4QL, UK
[4] Department of Physics and Astronomy, Macquarie University, Sydney, NSW 2109, Australia
[5] Department of Physics, University of Cincinnati, Cincinnati, OH 45221, USA
[6] Space Science Institute, 475 Walnut St., Suite 205, Boulder, CO 80301, USA
[7] Visiting Astronomer, NASA Infrared Telescope Facility, operated by the University of Hawaii under contract with NASA
[8] Eureka Scientific, Inc., Oakland, CA 94602; Exoplanets and Stellar Astrophysics Laboratory, Code 667, GSFC, Greenbelt, MD 20771, USA
[9] Department of Physics, University of California Santa Barbara, Broida Hall, Santa Barbara, CA 93106, USA
[10] The Aerospace Corporation, Los Angeles, CA 90009, USA

The Astrophysical Journal, in press (arXiv:1304.2768)

Pre-transitional disks are protoplanetary disks with a gapped disk structure, potentially indicating the presence of young planets in these systems. In order to explore the structure of these objects and their gap-opening mechanism, we observed the pre-transitional disk V1247 Orionis using the Very Large Telescope Interferometer, the Keck Interferometer, Keck-II, Gemini South, and IRTF. This allows us spatially resolve the AU-scale disk structure from near- to mid-infrared wavelengths (1.5 to 13 μm), tracing material at different temperatures and over a wide range of stellocentric radii. Our observations reveal a narrow, optically-thick inner-disk component (located at 0.18 AU from the star) that is separated from the optically thick outer disk (radii > 46 AU), providing unambiguous evidence for the existence of a gap in this pre-transitional disk. Surprisingly, we find that the gap region is filled with significant amounts of optically thin material with a carbon-dominated dust mineralogy. The presence of this optically thin gap material cannot be deduced solely from the spectral energy distribution, yet it is the dominant contributor at mid-infrared wavelengths. Furthermore, using Keck/NIRC2 aperture masking observations in the H, K', and L' band, we detect asymmetries in the brightness distribution on scales of $\sim$ 15–40 AU, i.e. within the gap region. The detected asymmetries are highly significant, yet their amplitude and direction changes with wavelength, which is not consistent with a companion interpretation but indicates an inhomogeneous distribution of the gap material. We interpret this as strong evidence for the presence of complex density structures, possibly reflecting the dynamical interaction of the disk material with sub-stellar mass bodies that are responsible for the gap clearing.

Download/Website: `http://arxiv.org/abs/1304.2768`

Contact: `stefan.kraus@cfa.harvard.edu`

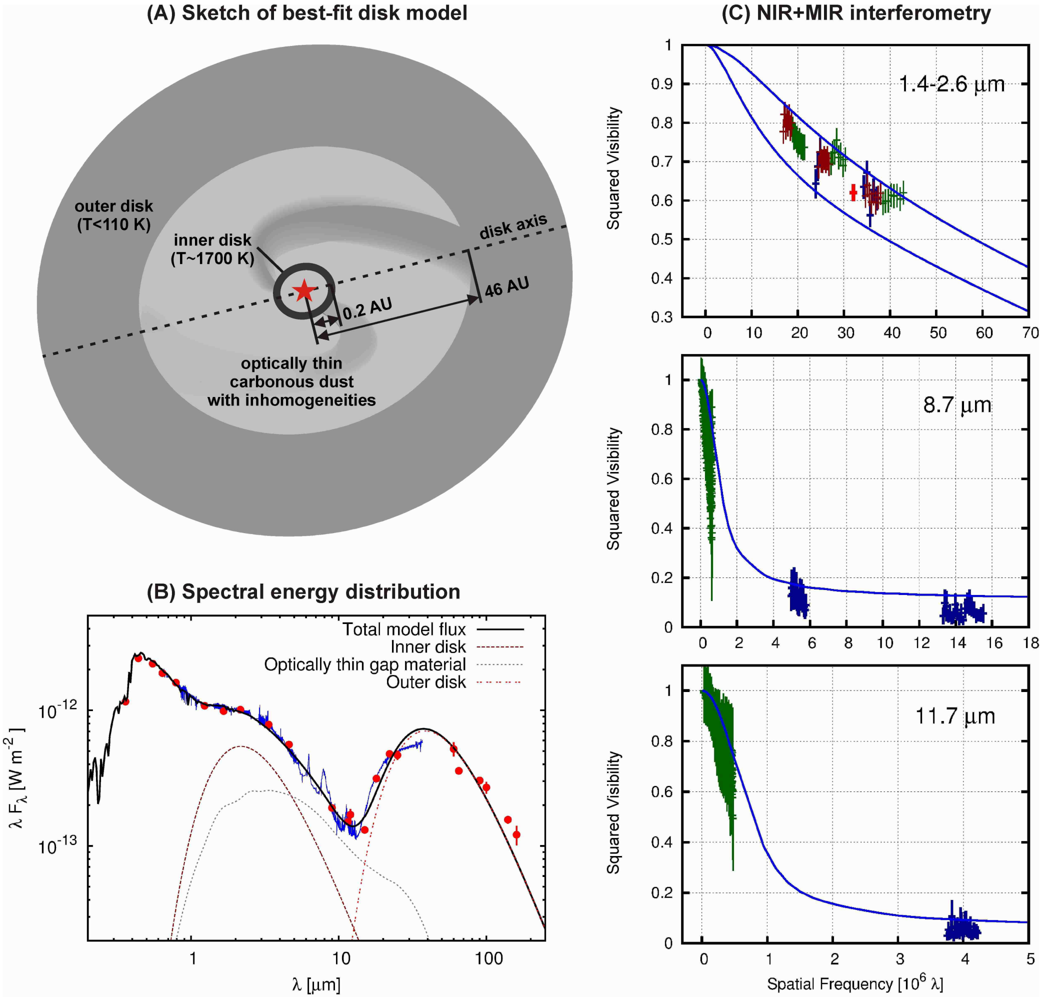

Figure 5: (Kraus et al.) Illustration of the V1247 Orionis system (A), as constrained by our spectro-interferometric observations, featuring a narrow, ring-like inner disk at the dust sublimation radius (0.18 AU), an extended disk gap, and an optically thick outer disk (at radii > 46 AU). Modeling the SED (B) and our VLTI+Keck+Gemini visibilities (C) reveals the presence of significant amounts of optically thin, carbonous dust located within the disk gap. The material within the gap is distributed inhomogeneous (as traced by our Keck/NIRC2 aperture masking observations), possibly due to the dynamical interaction of the disk material with (yet undiscovered) planets.

Dynamical analysis of the Gliese-876 Laplace resonance

J. G. Martí[1], *C. A. Giuppone*[1,2] *C. Beaugé*[1]
[1] Universidad Nacional de Córdoba, Observatorio Astronómico, IATE, Laprida 854, X5000BGR Córdoba, Argentina
[2] Departamento de Física, I3N, Universidade de Aveiro, Campus de Santiago, 3810-193 Aveiro, Portugal

Monthly Notices of the Royal Astronomical Society, in press. arXiv temporary submission identifier is: submit/0707338.

The existence of multiple planetary systems involved in mean motion conmensurabilities has increased significantly since the Kepler mission. Although most correspond to 2-planet resonances, multiple resonances have also been found. The Laplace resonance is a particular case of a three-body resonance where the period ratio between consecutive pairs is $n_1/n_2 \sim n_2/n_3 \sim 2/1$. It is not clear how this triple resonance can act in order to stabilize (or not) the systems.
The most reliable extrasolar system located in a Laplace resonance is GJ 876 because it has two independent confirmations. However best-fit parameters were obtained without previous knowledge of resonance structure and no exploration of all the possible stable solutions for the system where done.
In the present work we explored the different configurations allowed by the Laplace resonance in the GJ 876 system by varying the planetary parameters of the third outer planet. We find that in this case the Laplace resonance is a stabilization mechanism in itself, defined by a tiny island of regular motion surrounded by (unstable) highly chaotic orbits. Low eccentric orbits and mutual inclinations from -20 to 20 degrees are compatible with the observations. A definite range of mass ratio must be assumed to maintain orbital stability. Finally we give constrains for argument of pericenters and mean anomalies in order to assure stability for this kind of systems.

Contact: `jgmarti84@gmail.com`

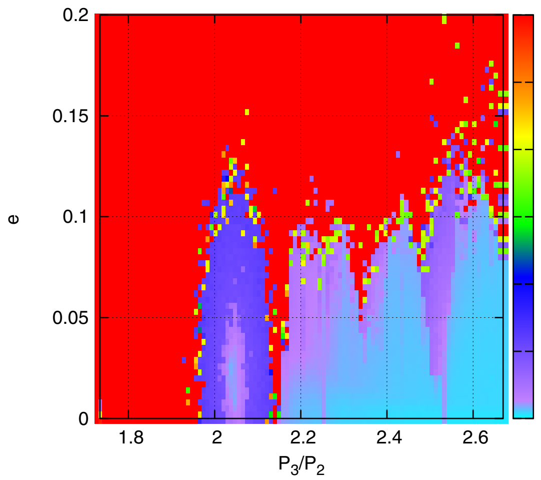

Figure 6: (Martí, Giuppone & Beaugé) Representative plane showing general dynamical properties of Laplace resonance. The masses and eccentricities are taken from Table 1 and the angles are: $\theta_1 = \theta_2 = \theta_3 = \Delta\varpi_{31} = 0$, $M_3 = 60°$), and $\Delta\varpi_{31}$=180°. All the conditions survived more than 4×10^4 years.

Magnetodynamo Lifetimes for Rocky, Earth-Mass Exoplanets with Contrasting Mantle Convection Regimes

Joost van Summeren, Eric Gaidos, Clinton P. Conrad
University of Hawaii, Honolulu, Hawaii, U.S.A.

Journal of Geophysical Research – Planets, in press (arXiv:1304.2437)

We used a thermal model of an iron core to calculate magnetodynamo evolution in Earth-mass rocky planets to determine the sensitivity of dynamo lifetime and intensity to planets with different mantle tectonic regimes, surface temperatures, and core properties. The heat flow at the core-mantle boundary (CMB) is derived from numerical models of mantle convection with a viscous/pseudo-plastic rheology that captures the phenomenology of plate-like tectonics. Our thermal evolution models predict a long-lived (∼8 Gyr) field for Earth and similar dynamo evolution for Earth-mass exoplanets with plate tectonics. Both elevated surface temperature and pressure-dependent mantle viscosity reduce the CMB heat flow but produce only slightly longer-lived dynamos (∼8–9.5 Gyr). Single-plate ("stagnant lid") planets with relatively low CMB heat flow produce long-lived (∼10.5 Gyr) dynamos. These weaker dynamos can cease for several billions of years and subsequently reactivate due to the additional entropy production associated with inner core growth, a possible explanation for the absence of a magnetic field on present-day Venus. We also show that dynamo operation is sensitive to the initial temperature, size, and solidus of a planet's core. These dependencies would severely challenge any attempt to distinguish exoplanets with plate tectonics and stagnant lids based on the presence or absence of a magnetic field.

Download/Website: `http://arxiv.org/abs/1304.2437.pdf`

Contact: `summeren@hawaii.edu`

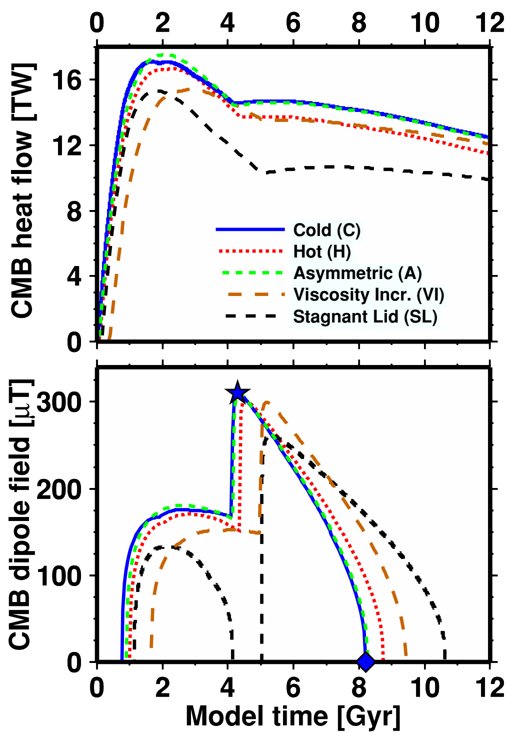

Figure 7: (van Summeren et al.) Dynamo evolution for 5 scenarios of mantle convection. (a) Heat flow at the CMB. (b) Magnetic dipole field intensity calculated at the CMB. The star and diamond indicate maximum CMB field intensity and time of dynamo cessation for the nominal Earth-like scenario C.

3 Abstracts of theses

A Stellar Variability Survey with STEREO

K.T. Wraight
Department of Physical Sciences, The Open University, Milton Keynes, MK7 6AA, UK

PhD Thesis, passed with minor corrections, now accepted

This thesis is the result of research done into different types of stellar variability using *STEREO*/HI-1. There are almost 900,000 stars in the field of view of *STEREO*/HI-1 and in order to manage the analysis of such numbers, the different types of variability were examined separately. Therefore, the analysis considered eclipsing binaries, chemically peculiar stars (rotational variables), short period variables (mostly pulsational variables) and long period variables (pulsational variables). In doing so, this work covers the main types of regular variability as well as the full range of timescales accessible, from periods of just a couple of hours to over a year, to a wide range of different types of star, from very hot O-type stars to cool M stars, including both young stars and stars that are nearing the end of their lives, also variability of very low amplitude, mere millimagnitudes for some rotational variables, to very large amplitudes, as much as several magnitudes for Miras, and variables have been observed as bright as 3rd magnitude down to the faint limit of 12th magnitude. As wide-ranging as my efforts have been, there is more that can yet be accomplished, from utilising *STEREO*/HI-2A data to identification and categorisation of new variables and the potential legacy for the photometric database is considerable.

Contact: `k.t.wraight@open.ac.uk`

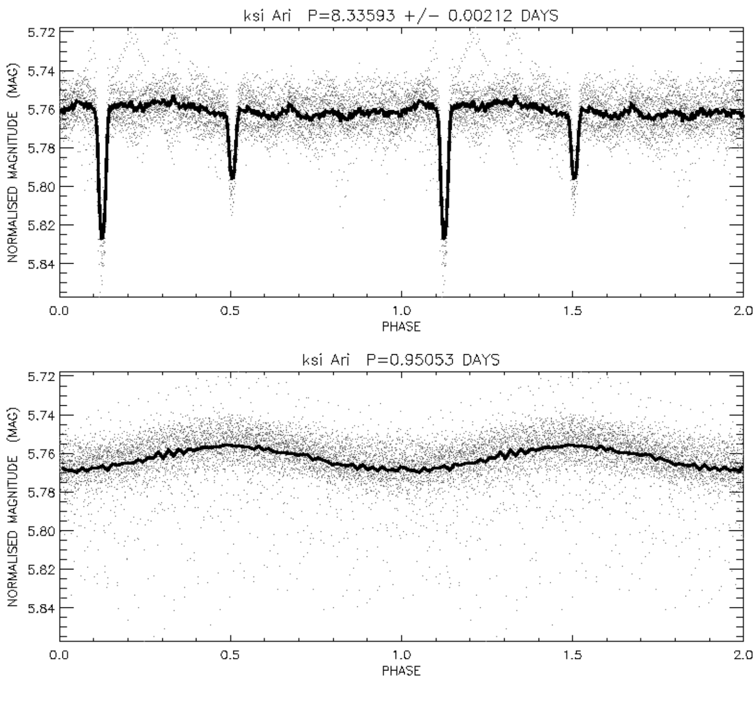

Figure 8: (Wraight) Phase-folded lightcurves showing two cycles of 24 Ari as an eccentric EB (top) and as a possibly pulsational variable (bottom).

4 Jobs and Positions

Infrared Astronomer/Instrumentation Scientist

Prof. Michael R. Meyer
Institute for Astronomy, ETH Zurich

Zurich, Sommer/Fall 2013

The Institute for Astronomy at the Swiss Federal Institute of Technology in Zurich (ETH Zurich) is searching for an infrared astronomer to help lead our Laboratory for Astronomical Instrumentation with a scientific focus on the search for, and characterization of extra-solar planets. Current projects include development of high contrast imagers and spectrographs in the infrared for existing large telescopes, as well as the next generation ELTs. Our group is involved in: i) SPHERE (a soon to be commissioned second-generation instrument for the VLT); ii) ERIS, a new infrared camera/spectrograph to take advantage of the new adaptive secondary for the VLT; iii) METIS (a planned mid-IR instrument for the E-ELT); and iv) and EPICS (a proposed high-contrast instrument for the E-ELT). We are also involved in CHEOPS, a Swiss-led exoplanet characterization space mission, as well as the NIRCam and NIRISS instrument science teams for the NASA/ESA/CSA JWST. Key activities in the next two years include: a) design and testing of filters, grisms, and diffraction-suppression optics from 1-5 microns in support of the ERIS project; and b) work on METIS including local project management, hardware development, interface with department workshop and industry partners, and project level support.

International applications are invited for positions ranging from Postdoctoral Fellow to Assistant Scientist capable of directing the lab. Salary will be commensurate with experience (starting at CHF 85'300 to over CHF 100'000) with junior appointments for a minimum of two years, and up to six+ years for senior candidates. Successful applicants will have the opportunity to: i) carry-out independent research; ii) work with students and other members of the group; and iii) access the full resources of the Star and Planet Formation Research Group. Switzerland is a member of ESO and ESA, and successful applicants will have full access to their facilities, as well as data from ongoing programs utilizing the Spitzer Space Telescope, HST, Herschel, the VLT, and other telescopes.

Applications should consist of a CV, past research and instrumentation experience, and proposed future activities (combined length not to exceed 10 pages) with a separate publication list. These materials (as a single pdf file) as well as up to three letters of reference (directly from the referees) should be sent via email. The closing date for receipt of application is July 1, 2013. Review of applications will begin immediately and continue until the position is filled.

Attention: Mrs. Marianne Chiesi
Institute for Astronomy, ETH Zurich
Wolfgang-Pauli-Strasse 27
HIT J 21.2
Star and Planet Formation Research Group
8093 Zurich, Switzerland

Contact: Email Submission Address: chiesinm@phys.ethz.ch; Email Inquiries: mmeyer@phys.ethz.ch

Download/Website: http://www.astro.ethz.ch/meyer; http://www.astro.ethz.ch/

EtaEarth PDRA specializing in Circumbinary Planets

Don Pollacco[1], *Stephane Udry*[2], *Chris Watson*[3]

Department of Physics, University of Warwick , closing date: 27th May 2013

Application are invited for a Postdoctoral Research Assistant position to work with Prof's Don Pollacco and Stephane Udry and based at the Department of Physics, Warwick University, UK. The successful candidate will participate in the detection and characterisation of circumbinary planetary systems from both photometric and spectroscopic datasets with a view to understanding their dynamical histories and formation.

The post is funded through the EtaEarth consortium under the European FP7 initiative and aims to exploit exoplanet candidates from NASA's Kepler mission, using a range of facilities including HARPS-North based at the TNG on La Palma. The position will be funded through Queens University Belfast but will be based at the University of Warwick where Prof Pollacco has recently relocated.

Applicants should have a PhD in Astrophysics (or related subject) and preferably exoplanet experience. They should have recent experience of spectroscopy and/or photometry at optical or IR wavelengths and experienced in data reduction techniques. The position is available immediately. Salary: £30,424-£39,649 per annum (including contribution points).

Further details on the application process are available from
`http://www.qub.ac.uk/sites/QUBJobVacancies/OtherJobs/ResearchJobs/`
(See Research Fellow, Ref. 13/102621)

Note: Closing date for applications is the 27th May 2013

Download/Website: `http://www.qub.ac.uk/sites/QUBJobVacancies/OtherJobs/ResearchJobs/`

Contact: `d.pollacco@warwick.ac.uk`

Senior research fellow at Lund Observatory

Lund University, starting time negotiable

Research on the formation and evolution of planetary systems is in rapid development, fuelled by the wealth of new observational data and the advent of more and more powerful supercomputers. Lund University invites applicants to a researcher position within the topic of planet formation around the sun and around other stars.

The researcher will work on theoretical/computational models of planet formation around the sun and around other stars.

Applicants must have a PhD in astronomy or astrophysics and a proven track record in the research methods related to planetesimals, planet formation or exoplanets. Previous experience in computational astrophysics is an extra merit.

Part of the research can consist of own, independent projects. Please contact Anders Johansen (anders@astro.lu.se) for details.

The application should contain:

- A cover letter describing the applicant's background and motivation for applying for the job
- A CV with information about previous positions (if applicable)
- List of publications
- Name and contact information of at least two reference persons

Applications should be submitted electronically - please follow the link below. The deadline is 31 May 2013.

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

Contact: `anders@astro.lu.se`

5 Conference announcements

PLATO 2.0 Science Workshop

H. Rauer[1], *M.-J. Goupil*[2], *A. Heras*[3], *G. Piotto*[4], *D. Pollacco*[5], *S. Udry*[6]
[1] DLR, Germany
[2] Observatoire de Paris, France
[3] ESA
[4] University of Padova, Italy
[5] University of Warwick, UK
[6] University of Geneva, Switzerland

ESTEC, Noordwijk, The Netherlands, 29 - 31 July 2013

PLATO 2.0 is an ESA M3 candidate mission and has been designed and optimized from the outset specifically to detect habitable zone rocky sized planets around bright solar type stars. Not only are these host stars suitable for planetary confirmation and follow-up studies, but they are ideal for asteroseismology studies whose impact has been proven from the CoRoT and Kepler missions. Thus PLATO 2.0 will produce catalogues of accurate parameters of terrestrial planets and planetary systems. It will be the first large-scale survey determining the ages of its detected planetary systems from their host stars. PLATO 2.0 data will be vital to test and develop planetary formation and evolution models and to address planetary science questions via its large numbers of accurate bulk planet parameters in systems of all kinds. As a result of the many hundred thousands of stars observed, PLATO 2.0 has furthermore a large complementary and legacy science program, from stellar to galactic science.

The PLATO 2.0 Science Workshop is open to the interested community. It will be held at ESA-ESTEC, Noordwijk, on 29-31 July, 2013.

The workshop shall examine the impact that PLATO will make on all areas of exoplanet, stellar, and legacy science areas. The preliminary program addresses a range of topics, describing the mission and where PLATO 2.0 will make an impact, e.g.:

- The PLATO 2.0 Mission
- Exoplanet science in the next decade
- Asteroseismology across the HR diagram
- Composition and internal structure of planets
- Planet formation and evolution
- Indications for extended atmospheres around small planets
- Star-planet interaction, stellar activity and planet detection
- Legacy science

The Scientific Organising Committee therefore invites abstracts and presentations, which contribute to these conference objectives. Please refer to the Preliminary Programme.

The conference will start on 29 July at 13:00 and will finish on 31 July at noon.
Deadline for abstract submission: 26 June 2013; deadline for registration: 12 July 2013

Download/Website: `http://www.sciops.esa.int/index.php?project=CONF2013&page=PLATO2013`

Contact: `heike.rauer@dlr.de`

NEAT 2013 Simulation Workshop

Workshop organizers: F. Malbet[1], A. Léger[2], G. Anglada-Escudé[3] on behalf of the NEAT consortium

[1] Laboratoire d'Astrophysique de Grenoble, France
[2] Institut dAstrophysique Spatiale, Paris, France
[3] Institute for Astrophysics, University of Goettingen, Germany

Institut de Planétologie et d'Astrophysique de Grenoble, France, Date: 27-28 May 2013

The NEAT (Nearby Earth Astrometric Telescope) mission is a proposition for a M-size mission within the Cosmic Vision 2015-2025 plan. The main scientific goal of the NEAT mission is to detect and characterize planetary systems in an exhaustive way down to 1 Earth mass in the habitable zone and further away, around nearby stars for F, G, and K spectral types. This survey would provide the actual planetary masses, the full characterization of the orbits including their inclination, for all the components of the planetary system down to that mass limit. The main science drivers are identification of Terrestrial planets in the habitable zone of nearby solar-type stars, constraints for planetary formation scenario, interaction of planets in planetary systems, exploration of a new part of the parameter space to understand the diversity of exoplanets.

As discussed during the NEAT workshop in November 2011, it is time to start "*data simulator*" activities for NEAT. The idea is to merge different software tools to build a pipeline that will be able to transform any given planetary systems in realistic NEAT signals including different sources of noises. Once the pipeline will be ready, we will generate random planetary systems, transform them to astrometric signals and see if the NEAT data processing teams are able to retrieve the characteristics of the systems with adequate accuracy.

The idea is to gather the competences of different groups:

1. planetary population synthesis
2. planetary dynamics to generate ephemeris
3. generation of stellar noises
4. attribute each system to an actual star with reference stars
5. Define a baseline astrometric and Doppler model
6. Generate photometry, radial velocities and differential astrometry
7. Simulate realistic Doppler measurements and cadence at 1 m/s precision
8. Simulate Gaia observations (50 muas/epoch x 80 epochs)
9. Simulate 50 measures of 0.8uas/sqrt(h) NEAT signals
10. Data processing code to retrieve the parameters of the planetary systems

The 2013 NEAT workshop is aimed at gathering experts from the different fields to build the NEAT simulator and run a double blind test with hidden initial values to be retrieved. The result of this work will demonstrate the capability of a high precision astrometry mission coupled with RV and Gaia to find all planetary components down to the Earth mass around our close neighbors.

The format of the workshop will leave a lot of time for discussion. We will not request any organizational fee, but each participant should take care of his/her own accommodation (a list of hotels is provided). Lunches will be provided for both days.

Registration There is no fee registration. If you are interested to join and participate to the discussions, please contact Fabien Malbet (`Fabien.Malbet@obs.ujf-grenoble.fr`).

Download/Website: `http://neat.obs.ujf-grenoble.fr/NEAT2013WS.html`

Contact: `Fabien.Malbet@obs.ujf-grenoble.fr`

EChO Open Science Workshop

Kate Isaak
ESA

ESTEC, Noordwijk, The Netherlands, 1st - 3rd July, 2013

We kindly invite you to attend EChO2013, an open workshop about the EChO (Exoplanet Characterisation Observatory) M3 mission candidate to be held at ESA-ESTEC in Noordwijk (Netherlands) on July 1-3, 2013.

EChO is a mission dedicated to the observation of atmospheres of planets around nearby stars. These planets will span a range of masses, from gas giants to super-Earths, stellar companions and temperatures, from hot to habitable. EChO will investigate their composition and chemical/physical properties through repeated, simultaneous, multi-wavelength spectroscopic observations.

This international workshop will provide an overview of the EChO mission and an opportunity for discussion and feedback in advance of the ESA Cosmic Vision review process. The ESA study and science teams will present the science case, mission objectives and concept, with invited talks by Industry and the Instrument Consortium on the mission and instrument designs respectively. Contributions from the Community covering all aspects of EChO, including science, targets, data processing and instrument design/critical technologies are welcomed. Time will be set aside for dedicated poster sessions and discussion. There will be no fee for attending this workshop.

The deadline for submitting abstracts is 24th May, and for registration 14th June. A preliminary programme is given on the programme page and will be finalised by the end of May.

We look forward to seeing you at the EChO workshop in July.

On behalf of the EChO Workshop SOC: Pierre Drossart, Paul Hartogh, Kate Isaak, Christophe Lovis, Giusi Micela, Marc Ollivier, Ignasi Ribas, Ignas Snellen, Bruce Swinyard, Giovanna Tinetti

Download/Website: `http://www.echo2013.net`

Contact: `kate.isaak@esa.int,sun.deby@esa.int`

European Planetary Science Congress

J. N. Yates[1,2], *L. C. Ray*[1,2], *M. Hollis*[1,2], *J. Cho*[3]

[1] Department of Physics and Astronomy, University College London, Gower Street, London, UK
[2] Centre for Planetary Sciences at UCL / Birkbeck, University College London, Gower Street, London, UK
[3] School of Physics and Astronomy, Queen Mary University of London, Mile End Road, London, UK

University College London, London, UK, 8 - 13 September 2013

Dear colleagues,

We would like to draw your attention to the following session to be held during the European Planetary Science Congress at University College London between 8 and 13 September 2013. Below is the link for abstract submission. The abstract submission deadline is 6 May.

Kind regards,

Japheth Yates, on behalf of all named conveners

Session number and title: GP2 - Aeronomy of Giant Planets
Conveners: J. N. Yates, L. C. Ray, M. Hollis, J. Cho

Abstract:
The aeronomy and dynamics of solar system planet atmospheres have been modelled using Global Circulation Models (GCMs) for many decades. In recent years, GCMs have also been applied to exoplanet atmospheres - as many of them share many characteristics with solar system planet atmospheres (e.g., composition, ionization levels, rotation and stratification, etc.). Many Jupiter-size exoplanets are also found much nearer to their central star than Jupiter is to the Sun, posing an interesting challenge for coupling aeronomy and dynamics. We propose a joint session to discuss and compare the latest modelling results, including (but not limited to):

i) The various sources of available energy and how the energy depositions affect the neutral and ionised components of the upper atmospheres on gas giants, ice giants, and hot Jupiters.

ii) The coupling between the lower neutral atmosphere, ionosphere and magnetosphere.

iii) The atmospheric energy budget of these worlds.

The broad goal of this session is to spark dialogue and new collaborations between Earth, solar system and extrasolar system upper atmosphere communities.

Download/Website: `http://www.epsc2013.eu/abstract_management/how_to_submit_an_abstract.html`

Contact: `japheth.yates.09@ucl.ac.uk`

Exoclimes III - the Diversity of Planetary Atmospheres

Frederic Pont
Exeter University, UK

Davos, Switzerland, 9-14 February 2014

This meeting will bring together Earth, Solar System and Exoplanet specialists to discuss recent results and the way ahead.
Topics:

- Earth: atmosphere, oceans, interior, paleo-climates, generalizations to exoplanets
- Solar System: Venus, Mars and Titan, gas giants: atmospheres, clouds, circulation models
- Gas-rich and rock/ice exoplanets: atmospheres, spectral and evolutionary models, climate models
- Brown dwarfs and directly imaged exoplanets: observations, spectral and evolutionary models, clouds, the L-T transition, temporal variability

Current list of confirmed invited reviews is:
Dorian Abbot – Paleo-climates
Daniel Apai – Brown dwarf observations
Travis Barman – Model brown dwarf spectra
Jean-Michel Desert – Exoplanet observations
Linda Elkins-Tanton – Interior-atmosphere interactions
Jonathan Fortney – Model exoplanet spectra
Yohai Kaspi – Jupiter
Heather Knutson – Exoplanet observations
Kristen Menou – Exoplanet circulation models
Jonathan Mitchell – Titan
Julianne Moses – Photochemistry
Ray Pierrehumbert – Exotic atmospheres
Tamara Rodgers – Magneto-hydrodynamics
Tapio Schneider – Climate dynamics
Paul Tackley – Earth's interior dynamics

Download/Website: `http://www.exoclimes.org`

Contact: `fpont@astro.ex.ac.uk`

6 As seen on astro-ph

The following list contains all the entries relating to exoplanets that we spotted on astro-ph during April 2013. If you see any that we missed, please let us know and we'll include them in the next issue.

astro-ph/1304.0005: **The GAPS programme with HARPS-N at TNG. I: Observations of the Rossiter-McLaughlin effect and characterisation of the transiting system Qatar-1** by *E. Covino, et al.*

astro-ph/1304.0373: **Simultaneous Exoplanet Characterization and deep wide-field imaging with a diffractive pupil telescope** by *Olivier Guyon et al.*

astro-ph/1304.0395 : **Carbon and Oxygen Abundances in the Hot Jupiter Exoplanet Host Star XO-2N and its Binary Companion** by *Johanna K. Teske, et al.*

astro-ph/1304.0459: **Tidal dissipation and eccentricity pumping: Implications for the depth of the secondary eclipse of 55 Cnc e** by *Emeline Bolmont, et al.*

astro-ph/1304.0460: **A Plateau in the Planet Population Below Twice the Size of Earth** by *Erik A. Petigura, Geoffrey W. Marcy, Andrew W. Howard*

astro-ph/1304.0481 : **Fast-evolving weather for the coolest of our two new substellar neighbours** by *M. Gillon et al.*

astro-ph/1304.0993: **Interior Structure of Water Planets: Implications for their dynamo source regions** by *Bob Yunsheng Tian, Sabine Stanley*

astro-ph/1304.1048: **On the co-orbital motion of two planets in quasi-circular orbits** by *Philippe Robutel, Alexandre Pousse*

astro-ph/1304.1150: **Protoplanetary disk evolution and stellar parameters of T Tauri binaries in Chamaeleon I** by *Sebastian Daemgen, et al.*

astro-ph/1304.1157: **On the Possibility of Habitable Moons in the System of HD 23079: Results from Orbital Stability Studies** by *M. Cuntz, et al.*

astro-ph/1304.1399: **A sensitivity analysis of the WFCAM Transit Survey for short-period giant planets around M dwarfs** by *Gábor Kovács, et al.*

astro-ph/1304.1425: **On the equilibrium figure of close-in planets and satellites** by *Alexandre C.M. Correia, Adrian Rodriguez*

astro-ph/1304.1563: **Stability Analysis of Possible Terrestrial Planets in the HD 60532 System** by *S. Rothwangl, S. Eggl, R. Dvorak*

astro-ph/1304.1736: **Asymmetric transition disks: Vorticity or eccentricity?** by *S. Ataiee et al.*

astro-ph/1304.2140: **HATS-2b: A transiting extrasolar planet orbiting a K-type star showing starspot activity** by *M. Mohler-Fischer, et al.*

astro-ph/1304.2405: **DONUTS: A science frame autoguiding algorithm with sub-pixel precision, capable of guiding on defocused stars** by *J. McCormac et al.*

astro-ph/1304.2437: **Magnetodynamo Lifetimes for Rocky, Earth-Mass Exoplanets with Contrasting Mantle Convection Regimes** by *Joost van Summeren, Eric Gaidos, Clinton P. Conrad*

astro-ph/1304.2638: **The Hyades Cluster: Identification of a Planetary System and Escaping White Dwarfs** by *B. Zuckerman, et al.*

astro-ph/1304.2700 : **Phyllosilicate Emission from Protoplanetary Disks: Is the Indirect Detection of Extrasolar Water Possible?** by *Melissa A. Morris, Steven J. Desch*

astro-ph/1304.2815: **Very Low Mass Stellar and Substellar Companions to Solar-Like Stars From MARVELS V: A Low Eccentricity Brown Dwarf from the Driest Part of the Desert, MARVELS-6b** by *Nathan De Lee, et al.*

astro-ph/1304.2895: **Where to Find Habitable "Earths" in Circumbinary Systems** by *Hui-Gen Liu, Hui Zhang, Ji-Lin Zhou*

astro-ph/1304.2909: **The Influence of Thermal Evolution in the Magnetic Protection of Terrestrial Planets** by *Jorge I. Zuluaga et al.*

astro-ph/1304.2925: **The detectability of habitable exomoons with Kepler** by *Supachai Awiphan, Eamonn Kerins*
astro-ph/1304.3125: **Debris discs around M stars: non-existence versus non-detection** by *Kevin Heng, Matej Malik*
astro-ph/1304.3152: **Greatly Enhanced Eccentricity Oscillations in Quadruple Systems Composed of Two Binaries: Implications for Stars, Planets, and Transients** by *Ondrej Pejcha, et al.*
astro-ph/1304.3341: **Exoplanet Predictions Based on the Generalised Titius-Bode Relation** by *Timothy Bovaird, Charles H. Lineweaver*
astro-ph/1304.3455: **LSST's DC Bias Against Planets and Galactic-Plane Science** by *Andrew Gould*
astro-ph/1304.3714: **Towards the Minimum Inner Edge Distance of the Habitable Zone** by *Andras Zsom, Sara Seager, Julien de Wit*
astro-ph/1304.4014: **Detection of carbon monoxide in the high-resolution day-side spectrum of the exoplanet HD 189733b** by *Remco J. de Kok, et al.*
astro-ph/1304.4121: **Relationship Between Thermal Tides and Radius Excess** by *Aristotle Socrates*
astro-ph/1304.4130: **Astrophysical false positives in direct imaging for exoplanets: a white dwarf close to a rejuvenated star** by *A. Zurlo, et al.*
astro-ph/1304.4148: **On the Tidal Dissipation of Obliquity** by *T.M. Rogers, D.N.C. Lin*
astro-ph/1304.4215: **Volatile Transport inside Super-Earths by Entrapment in the Water Ice Matrix** by *Amit Levi, Dimitar Sasselov, Morris Podolak*
astro-ph/1304.4283: **KOI-142, the King of Transit Variations, is a Pair of Planets near the 2:1 Resonance** by *David Nesvorny, et al.*
astro-ph/1304.4328: **Planetary Companions to Three Evolved Intermediate-Mass Stars: HD 2952, HD 120084, and omega Serpentis** by *Bun'ei Sato, et al.*
astro-ph/1304.4377: **Dynamical Effects on the Habitable Zone for Earth-like Exomoons** by *Duncan Forgan, David Kipping*
astro-ph/1304.4762: **The formation of systems with closely spaced low-mass planets and the application to Kepler-36** by *Sijme-Jan Paardekooper, Hanno Rein, Willy Kley*
astro-ph/1304.4810: **Colliding Decimetre Dust** by *Johannes Deckers, Jens Teiser*
astro-ph/1304.4941: **A super-Earth-sized planet orbiting in or near the habitable zone around Sun-like star** by *Thomas Barclay, et al.*
astro-ph/1304.4961: **VLT-CRIRES Survey of Rovibrational CO Emission from Protoplanetary Disks** by *Joanna M. Brown, et al.*
astro-ph/1304.4978: **Towards a Population Synthesis Model of Objects formed by Self-Gravitating Disc Fragmentation and Tidal Downsizing** by *Duncan Forgan, Ken Rice*
astro-ph/1304.5058: **Water Planets in the Habitable Zone: Atmospheric Chemistry, Observable Features, and the case of Kepler-62e and -62f** by *L. Kaltenegger, D. Sasselov, S. Rugheimer*
astro-ph/1304.5157: **Mass-Radius Relationships for Very Low Mass Gaseous Planets** by *Konstantin Batygin, David J. Stevenson*
astro-ph/1304.5166: **A Primordial Origin for Misalignments Between Stellar Spin Axes and Planetary Orbits** by *Konstantin Batygin*
astro-ph/1304.5505: **Planets around stars in young nearby associations – Radial Velocity searches: a feasibility study, and first results** by *A.-M. Lagrange, et al.*
astro-ph/1304.5561: **A Systematic Retrieval Analysis of Secondary Eclipse Spectra I: A Comparison of Atmospheric Retrieval Techniques** by *Michael R. Line, et al.*
astro-ph/1304.5713: **APOSTLE: Longterm Transit Monitoring and Stability Analysis of XO-2b** by *Praveen Kundurthy, et al.*
astro-ph/1304.5853: **Direct Imaging in the Habitable Zone and the Problem of Orbital Motion** by *Jared R. Males, Andrew J. Skemer, Laird M. Close*
astro-ph/1304.6002: **KOI-200b and KOI-889b: two transiting exoplanets detected and characterized with**

Kepler, SOPHIE and HARPS-N by *G. Hebrard, et al.*

astro-ph/1304.6037 : **Characterisation of global flow and local fluctuations in 3D SPH simulations of protoplanetary discs** by *Serena Arena, Jean-Franois Gonzalez*

astro-ph/1304.6104: **Why Does Nature Form Exoplanets Easily?** by *Kevin Heng*

astro-ph/1304.6124: **Origin Scenarios for the Kepler 36 Planetary System** by *Alice C. Quillen, Eva Bodman, Alexander Moore*

astro-ph/1304.6127: **The potential for photosynthesis in hydrothermal vents: a new avenue for life in the Universe?** by *Noel Perez, et al.*

astro-ph/1304.6398: **Lightcurves of Stars & Exoplanets: Estimating Inclination, Obliquity, and Albedo** by *Nicolas B. Cowan, Pablo A. Fuentes, Hal M. Haggard*

astro-ph/1304.6472: **Water-Trapped Worlds** by *Kristen Menou*

astro-ph/1304.6638: **Explaining millimeter-sized particles in brown dwarf disks** by *P. Pinilla, et al.*

astro-ph/1304.6673: **Detrending the long-term stellar activity and the systematics of the Kepler data with a non-parametric approach** by *C. Danielski, T. Kacprzak, G. Tinetti*

astro-ph/1304.6726: **Exoplanet Characterization by Proxy: a Transiting 2.15 R_Earth Planet Near the Habitable Zone of the Late K dwarf Kepler-61** by *Sarah Ballard, et al.*

astro-ph/1304.6755 : **Planetary-mass companions to the K-giants BD+15 2940 and HD 233604** by *G. Nowak, et al.*

astro-ph/1304.6841: **BEER analysis of Kepler and CoRoT light curves: I. Discovery of a hot Jupiter with superrotation evidence in Kepler data** by *Simchon Faigler, et al.*

astro-ph/1304.6892: **Stability of binary on highly eccentric orbit** by *Alexey Rosaev*

astro-ph/1304.6953: **The Effect of Lower Mantle Metallization on Magnetic Field Generation in Rocky Exoplanets** by *Ryan Vilim, Sabine Stanley, Linda Elkins-Tanton*

astro-ph/1304.7246 : **Seventy six T dwarfs from the UKIDSS LAS: benchmarks, kinematics and an updated space density** by *Ben Burningham, et al.*

astro-ph/1304.7248: **A search for rocky planets transiting brown dwarfs** by *Amaury H.M.J. Triaud, et al.*

astro-ph/1304.7269: **Testing the Metal of Late-Type Kepler Planet Hosts with Iron-Clad Methods** by *Andrew W. Mann, et al.*

astro-ph/1304.7374: **Two Super-Earths Orbiting the Solar Analogue HD41248 on the edge of a 7:5 Mean Motion Resonance** by *James S. Jenkins, et al.*

astro-ph/1304.7387: **Kepler-62: A five-planet system with planets of 1.4 and 1.6 Earth radii in the Habitable Zone** by *W. J. Borucki et al.*

astro-ph/1304.7503: **100-year DASCH Light Curves of Kepler Planet-Candidate Host Stars** by *Sumin Tang, et al.*

astro-ph/1304.7683: **Close Stellar Encounters in Young, Substructured, Dissolving Star Clusters: Statistics and Effects on Planetary Systems** by *Jonathan M. Craig, Mark R. Krumholz*

astro-ph/1304.7784: **Instabilities at planetary gap edges in 3D self-gravitating disks** by *Min-Kai Lin*