ExoPlanet News
An Electronic Newsletter

No. 73, October 1st, 2014

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Contents

1 Editorial

Here is the 73rd edition of ExoPlanet News. The field of exoplanet research continues to thrive, with a great range of abstracts, conference & meeting announcements, and jobs & studentships all presented this month.

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. Although please note that, following a change to the way our webservers operate, our system manager has now configured things so that my updates to the website only become live over-night, so it may be up to 24 hours from the time the newsletter is e-mailed out before it is available on the website.

Best wishes
Andrew Norton
The Open University

2 Abstracts of refereed papers

Revision of Earth-sized Kepler Planet Candidate Properties with High Resolution Imaging by Hubble Space Telescope

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The Astrophysical Journal, in press (arXiv:1407.1057)

We present the results of our *Hubble Space Telescope* program and describe how our image analysis methods were used to re-evaluate the habitability of some of the most interesting *Kepler* planet candidates. Our program observed 22 *Kepler* Object of Interest (KOI) host stars, several of which were found to be multiple star systems unresolved by *Kepler*. We use our high-resolution imaging to provide a conversion to the *Kepler* photometric bandpass (Kp) from the F555W and F775W filters on WFC3/UVIS, and spatially resolve the stellar multiplicity of Kepler-296, KOI-2626, and KOI-3049. The binary system Kepler-296 (5 planets) has a projected separation of 0.217" (80 AU); KOI-2626 (1 planet) is a triple star system with a projected separation of 0.201" (70 AU) between the primary and secondary components and 0.161" (55 AU) between the primary and tertiary components; and the binary system KOI-3949 (1 planet) has a projected separation of 0.464" (225 AU). We used our measured photometry to fit the separated components to the latest Victoria-Regina Stellar Models with synthetic photometry to determine the systems' co-eval natures. The individual components of the three systems range from mid-K dwarf to mid-M dwarf spectral types. We solved for the planetary properties in the three systems analytically by combining our independent stellar parameters and published transit light curve parameters. The planets now range in size from $\sim 1.2\,\mathrm{R}_\oplus$ to $\sim 4\,\mathrm{R}_\oplus$, placing them in the Super Earth/mini-Neptune regime. As a result of the stellar multiplicity, some planets previously in the Habitable Zone are, in fact, not, and other planets may be in the HZ depending on their assumed stellar host.

Download/Website: `http://arxiv.org/abs/1407.1057`

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Revisiting the transits of CoRoT-7b at a lower activity level

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Astronomy & Astrophysics, 2014A&A...569A..74B

The first super-Earth with measured radius discovered was CoRoT-7b and it has opened the new field of rocky exoplanet characterisation. To better understand this interesting system, new observations were taken with the CoRoT satellite. During this run 90 new transits were obtained in the imagette mode. These were analysed together with the previous 151 transits obtained in the discovery run and HARPS radial velocity observations to derive accurate system parameters. A difference is found in the posterior probability distribution of the transit parameters between the previous CoRoT run (LRa01) and the new run (LRa06). We propose that this is due to an extra noise component in the previous CoRoT run suspected of being transit spot occultation events. These lead to the mean transit shape becoming V-shaped. We show that the extra noise component is dominant at low stellar flux levels and reject these transits in the final analysis. We obtained a planetary radius, $R_p = 1.585 \pm 0.064\ R_\oplus$, in agreement with previous estimates. Combining the planetary radius with the new mass estimates results in a planetary density of $1.19 \pm 0.27\,\rho_\oplus$ which is consistent with a rocky composition. The CoRoT-7 system remains an excellent test bed for the effects of activity in the derivation of planetary parameters in the shallow transit regime.

Download/Website: `http://www.aanda.org/articles/aa/pdf/2014/09/aa23939-14.pdf`

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The Exoplanet Orbit Database II: Updates to exoplanets.org

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Publications of the Astronomical Society of the Pacific, in press, arXiv:1409.7709

The Exoplanet Orbit Database (EOD) compiles orbital, transit, host star, and other parameters of robustly detected exoplanets reported in the peer-reviewed literature. The EOD can be navigated through the Exoplanet Data Explorer (EDE) Plotter and Table, available on the World Wide Web at exoplanets.org. The EOD contains data for 1492 confirmed exoplanets as of July 2014. The EOD descends from a table in Butler et al. 2002 and the Catalog of Nearby Exoplanets Butler et al. 2006, and the first complete documentation for the EOD and the EDE was presented in Wright et al. 2011. In this work, we describe our work since then. We have expanded the scope of the EOD to include secondary eclipse parameters, asymmetric uncertainties, and expanded the EDE to include the sample of over 3000 *Kepler* Objects of Interest (KOIs), and other real planets without good orbital parameters (such as many of those detected by microlensing and imaging). Users can download the latest version of the entire EOD as a single comma separated value file from the front page of exoplanets.org.

Download/Website: `http://exoplanets.org`

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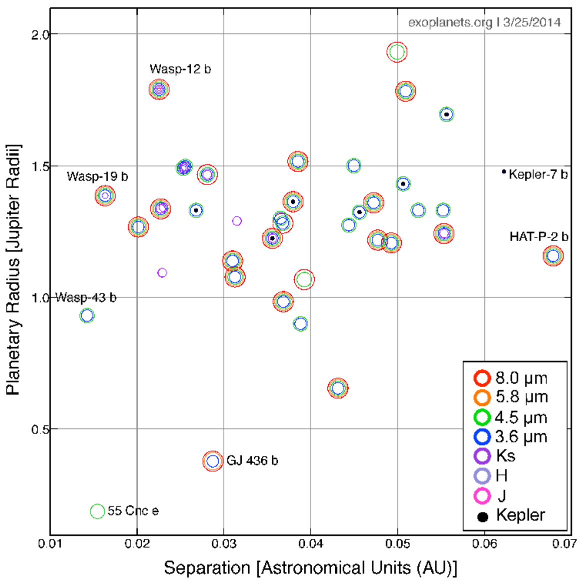

Figure 1: (Han et al.) An example plot that demonstrates the current secondary eclipse measurements. Each planet has a set of circles that stand for its available secondary eclipse measurements in the database, including *Spitzer* 8.0, 5.8, 4.5, & 3.6 μm, and ground-based J, H, and K_s bands. *Kepler* secondary eclipse measurements are labeled as solid black dots. A few representative planets are also annotated (a feature not offered by the EDE Plotter, but trivially implemented by other image or presentation software). The planet name will appear when the user points the cursor at the corresponding data point in the interactive plotting tools.

How to determine an exomoon's sense of orbital motion

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Astrophysical Journal Letters, in press (arXiv:1409.7245)

We present two methods to determine an exomoon's sense of orbital motion (SOM), one with respect to the planet's circumstellar orbit and one with respect to the planetary rotation. Our simulations show that the required measurements will be possible with the European Extremely Large Telescope (E-ELT). The first method relies on mutual planet-moon events during stellar transits. Eclipses with the moon passing behind (in front of) the planet will be late (early) with regard to the moon's mean orbital period due to the finite speed of light. This "transit timing dichotomy" (TTD) determines an exomoon's SOM with respect to the circumstellar motion. For the ten largest moons in the solar system, TTDs range between 2 and 12 s. The E-ELT will enable such measurements for Earth-sized moons around nearby stars. The second method measures distortions in the IR spectrum of the rotating giant planet when it is transited by its moon. This Rossiter-McLaughlin effect (RME) in the planetary spectrum reveals the angle between the planetary equator and the moon's circumplanetary orbital plane, and therefore unveils the moon's SOM with respect to the planet's rotation. A reasonably large moon transiting a directly imaged planet like β Pic b causes an RME amplitude of almost $100\,\mathrm{m\,s^{-1}}$, about twice the stellar RME amplitude of the transiting exoplanet HD209458 b. Both new methods can be used to probe the origin of exomoons, that is, whether they are regular or irregular in nature.

Download/Website: `http://arxiv.org/abs/1409.7245`

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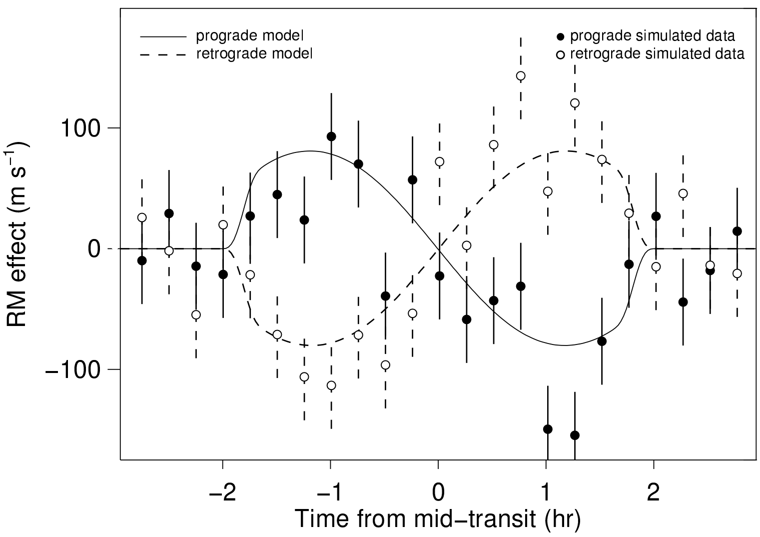

Figure 2: (Heller & Albrecht) Simulated Rossiter-McLaughlin effect in the resolved thermal spectrum of a hot, Jupiter-sized planet similar to β Pic b caused by a transiting giant moon ($0.7\,R_\oplus$, reasonable from a formation point of view). Solid and dashed lines correspond to a prograde and a retrograde coplanar moon orbit, respectively. Full and open circles indicate simulated E-ELT observations.

On the Frequency of Potential Venus Analogs from Kepler Data

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Astrophysical Journal Letters, in press (arXiv:1409.2886)

The field of exoplanetary science has seen a dramatic improvement in sensitivity to terrestrial planets over recent years. Such discoveries have been a key feature of results from the *Kepler* mission which utilizes the transit method to determine the size of the planet. These discoveries have resulted in a corresponding interest in the topic of the Habitable Zone (HZ) and the search for potential Earth analogs. Within the Solar System, there is a clear dichotomy between Venus and Earth in terms of atmospheric evolution, likely the result of the large difference (∼ factor of two) in incident flux from the Sun. Since Venus is 95% of the Earth's radius in size, it is impossible to distinguish between these two planets based only on size. In this paper we discuss planetary insolation in the context of atmospheric erosion and runaway greenhouse limits for planets similar to Venus. We define a "Venus Zone" (VZ) in which the planet is more likely to be a Venus analog rather than an Earth analog. We identify 43 potential Venus analogs with an occurrence rate (η_{venus}) of $0.32^{+0.05}_{-0.07}$ and $0.45^{+0.06}_{-0.09}$ for M dwarfs and GK dwarfs respectively.

Download/Website: `More information and graphics can be found at the Habitable Zone Gallery (http://hzgallery.org)`

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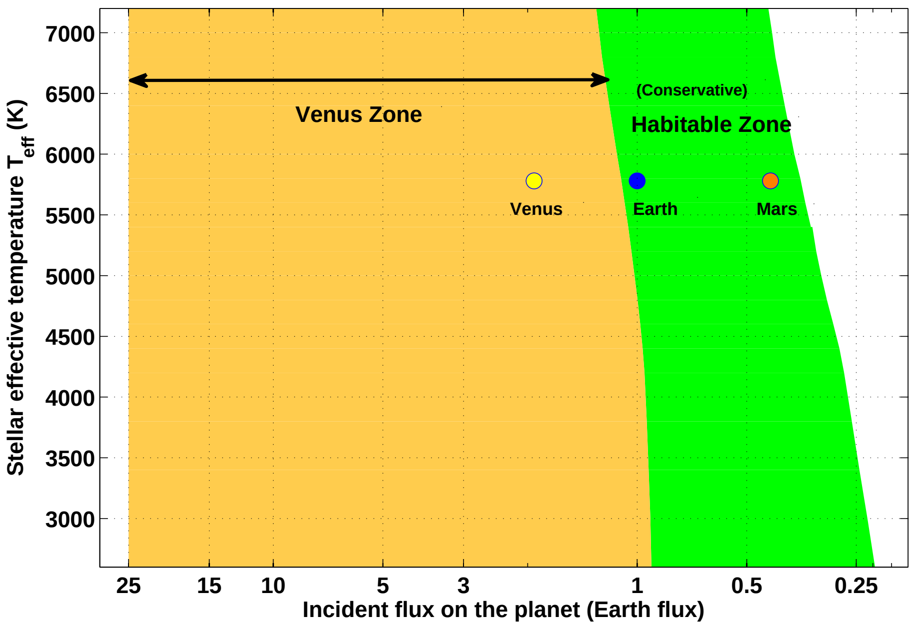

Figure 3: (Kane, Kopparapu & Domagal-Goldman) Incident stellar flux on a planet versus stellar effective temperature, showing the extent of the Venus Zone and (conservative) Habitable Zone.

The Mass Budget of Planet Forming Discs: Isolating the Epoch of Planetesimal Formation

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Monthly Notices of the Royal Astronomical Society, in press (arXiv:1409.7021)

The high rate of planet detection among solar-type stars argues that planet formation is common. It is also generally assumed that planets form in protoplanetary discs like those observed in nearby star forming regions. On what timescale does the transformation from discs to planets occur? Here we show that current inventories of planets and protoplanetary discs are sensitive enough to place basic constraints on the timescale and efficiency of the planet formation process. A comparison of planet detection statistics and the measured solid reservoirs in T Tauri discs suggests that planet formation is likely already underway at the few Myr age of the discs in Taurus-Auriga, with a large fraction of solids having been converted into large objects with low millimeter opacity and/or sequestered at small disc radii where they are difficult to detect at millimeter wavelengths.

Download/Website: `http://arxiv.org/abs/1409.7021/`

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Understanding the assembly of *Kepler's* compact planetary systems

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Monthly Notices of the Royal Astronomical Society, in press (arXiv:1409.0532)

The Kepler mission has recently discovered a number of exoplanetary systems, such as Kepler-11 and Kepler-32, in which ensembles of several planets are found in very closely packed orbits (often within a few percent of an AU of one another). These compact configurations present a challenge for traditional planet formation and migration scenarios. We present a dynamical study of the assembly of these systems, using an N-body method which incorporates a parametrized model of planet migration in a turbulent protoplanetary disc. We explore a wide parameter space, and find that under suitable conditions it is possible to form compact, close-packed planetary systems via traditional disc-driven migration. We find that simultaneous migration of multiple planets is a viable mechanism for the assembly of tightly-packed planetary systems, as long as the disc provides significant eccentricity damping and the level of turbulence in the disc is modest. We discuss the implications of our preferred parameters for the protoplanetary discs in which these systems formed, and comment on the occurrence and significance of mean-motion resonances in our simulations.

Download/Website: `http://arxiv.org/abs/1409.0532`

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Instrumentation for the detection and characterization of exoplanets

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Nature, published (2014Natur.513..358P/arXiv:1409.5266)

In no other field of astrophysics has the impact of new instrumentation been as substantial as in the domain of exoplanets. Before 1995 our knowledge about exoplanets was mainly based on philosophical and theoretical considerations. The following years have been marked, instead, by surprising discoveries made possible by high-precision instruments. More recently the availability of new techniques moved the focus from detection to the characterization of exoplanets. Next-generation facilities will produce even more complementary data that will lead to a comprehensive view of exoplanet characteristics and, by comparison with theoretical models, to a better understanding of planet formation.

Download/Website: `http://www.nature.com/nature/journal/v513/n7518/full/nature13784.html`

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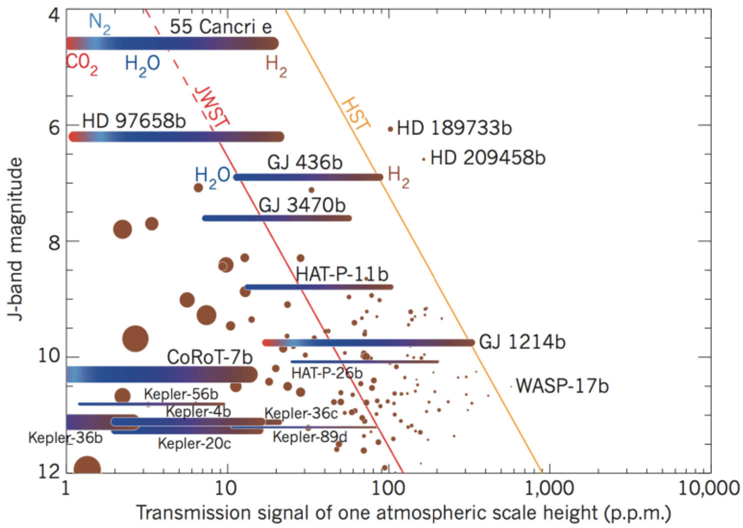

Figure 4: (Pepe, Ehrenreich & Meyer) Detectability of planetary atmospheres. The signal of one atmospheric scale height seen in transmission during transit is plotted against the stellar J magnitude. The size of the circles (and the thickness of the colour bars) scales with the planet mean density. For giant exoplanets (brown circles), the atmosphere is assumed to be primarily composed of molecular hydrogen and helium ($\mu = 2.3$ g mol^{-1}). For lower-mass planets, such as Neptunes ($10 < M_p < 60$ M$_\oplus$) and super- Earths ($M_p < 10$ M$_\oplus$), the atmospheric composition is unknown and the colour bar extents represent all possible signal values assuming hydrogen/helium and water ($\mu = 18$ g mol^{-1}, blue) dominated atmospheres for Neptunes, and molecular nitrogen ($\mu = 28$ g mol^{-1}, light blue) and carbon dioxide ($\mu = 44$ g mol^{-1}, red) dominated atmospheres for super-Earths, in addition to the two earlier types. Approximate HST and JWST 3-σ detection limits (orange and red lines, respectively) are shown. Only super-Earths and Neptunes with a mass determined to better than 20% are represented.

Short dissipation times of proto-planetary discs – an artifact of selection effects?

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Astrophysical Journal Letters, in press (arXiv:1409.0978)

The frequency of discs around young stars, a key parameter for understanding planet formation, is most readily determined in young stellar clusters where many relatively coeval stars are located in close proximity. Observational studies seem to show that the disc frequency decreases rapidly with cluster age with $<10\%$ of cluster stars retaining their discs for longer than 2-6 Myr. Given that at least half of all stars in the field seem to harbor one or more planets, this would imply extremely fast disc dispersal and rapid planet growth. Here we question the validity of this constraint by demonstrating that the short disc dissipation times inferred to date might have been heavily underestimated by selection effects. Critically, for ages $>$3Myr only stars that originally populated the densest areas of very populous clusters, which are prone to disc erosion, are actually considered. This tiny sample may not be representative of the majority of stars. In fact, the higher disc fractions in co-moving groups indicate that it is likely that over 30% of all field stars retain their discs well beyond 10 Myr, leaving ample time for planet growth. Equally our solar system, with a likely formation time $>$ 10 Myr, need no longer be an exception but in fact typical of planetary systems.

Download/Website: `http://arxiv.org/abs/1409.0978`

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WASP-104b and WASP-106b: two transiting hot Jupiters in 1.75-day and 9.3-day orbits

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Astronomy & Astrophysics, in press (arXiv:1408.0887)

We have used the WASP survey to discover two exoplanetary systems, each consisting of a Jupiter-sized planet transiting an 11th-magnitude (V) main-sequence star. WASP-104b orbits its star in 1.75 d, whereas WASP-106b has the fourth-longest orbital period of any planet discovered by means of transits observed from the ground, orbiting every 9.29 d. Each planet is more massive than Jupiter (WASP-104b has a mass of $1.27 \pm 0.05\ M_{\rm Jup}$, while WASP-106b has a mass of $1.93 \pm 0.08\ M_{\rm Jup}$). Both planets are just slightly larger than Jupiter, with radii of 1.14 ± 0.04 and $1.09 \pm 0.04\ R_{\rm Jup}$ for WASP-104 and WASP-106, respectively. No significant orbital eccentricity is detected in either system, and while this is not surprising in the case of the short-period WASP-104b, it is interesting in the case of WASP-106b, because many otherwise similar planets are known to have eccentric orbits.

Download/Website: `http://arxiv.org/abs/1408.0887`

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Resonant Chains and Three-body Resonances in the Closely-Packed Inner Uranian Satellite System

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Monthly Notices of the Royal Astronomical Society, in press, arXiv:1408.1141

Numerical integrations of the closely-packed inner Uranian satellite system show that variations in semi-major axes can take place simultaneously between three or four consecutive satellites. We find that the three-body Laplace angle values are distributed unevenly and have histograms showing structure, if the angle is associated with a resonant chain, with both pairs of bodies near first-order two-body resonances. Estimated three-body resonance libration frequencies can be only an order of magnitude lower than those of first-order resonances. Their strength arises from a small divisor from the distance to the first-order resonances and insensitivity to eccentricity, which make up for their dependence on moon mass. Three-body resonances associated with low-integer Laplace angles can also be comparatively strong due to the many multiples of the angle contributed from Fourier components of the interaction terms. We attribute small coupled variations in semi-major axis, seen throughout the simulation, to ubiquitous and weak three-body resonant couplings. We show that a system with two pairs of bodies in first-order mean-motion resonance can be transformed to resemble the well-studied periodically-forced pendulum with the frequency of a Laplace angle serving as a perturbation frequency. We identify trios of bodies and overlapping pairs of two-body resonances in each trio that have particularly short estimated Lyapunov timescales.

Download/Website: `http://arxiv.org/abs/1408.1141`

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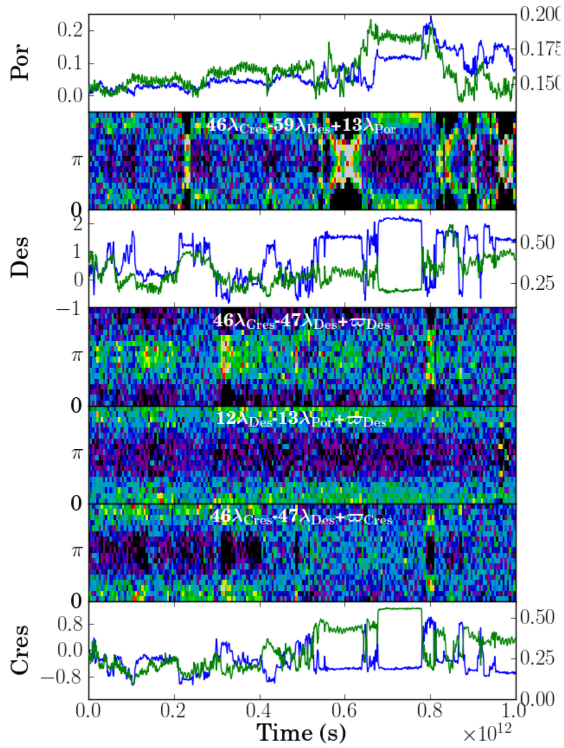

Figure 5: (Quillen & French) Two- and three-body resonances influencing Cressida, Desdemona and Portia. We plot both resonant angles (as histograms), semi-major axes (blue lines) and eccentricities (green lines) so that they can be directly compared. Transitions in the 46:-59:13 Laplace angle with Cressida, Desdemona and Portia are coincident with coupled variations in semi-major axes of the three moons.

Barycentric Corrections at 1 cm/s for precise Doppler velocities

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[4] Department of Physics, Broida Hall, University of California Santa Barbara, Santa Barbara, CA, 93117, USA

Publications of the Astronomical Society of the Pacific, in press (arXiv:1409.4774)

The goal of this paper is to establish the requirements of a barycentric correction with an RMS of $<=$ 1 cm/s, which is an order of magnitude better than necessary for the Doppler detection of true Earth analogs ($\sim$9 cm/s). We describe the theory and implementation of accounting for the effects on precise Doppler measurements of motion of the telescope through space, primarily from rotational and orbital motion of the Earth, and the motion of the solar system with respect to target star (i.e. the "barycentric correction"). We describe the minimal algorithm necessary to accomplish this and how it differs from a naïve subtraction of velocities (i.e. a Galilean transformation). We demonstrate the validity of code we have developed from the California Planet Survey code via comparison with the pulsar timing package, `TEMPO2`. We estimate the magnitude of various terms and effects, including relativistic effects, and the errors associated with incomplete knowledge of telescope position, timing, and stellar position and motion. We note that chromatic aberration will create uncertainties in the time of observation, which will complicate efforts to detect true Earth analogs. Our code is available for public use and validation.

Download/Website: `Preprint: http://arxiv.org/abs/1409.4774`
`Code: http://astroutils.astronomy.ohio-state.edu/exofast/`

Contact: `astrowright@gmail.com, jeastman@lcogt.net`

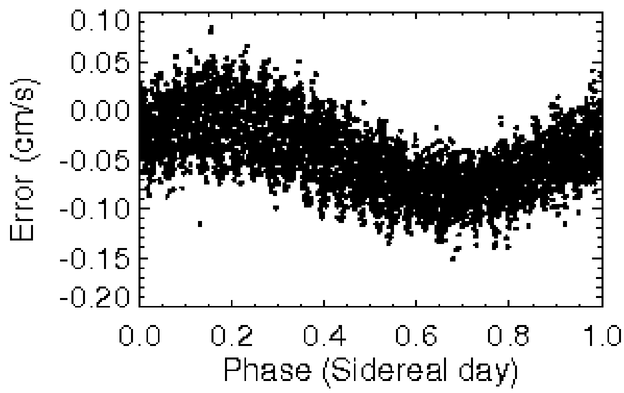

Figure 6: (Wright & Eastman) Comparison of the barycentric correction generated by TEMPO2 versus that generated with our code using the method described in this paper over a 14 year period. The residuals have an RMS of 0.037 cm/s and a peak to peak difference of 0.24 cm/s with no long term trend. The residuals phase with the sidereal period, suggesting that the dominant shortcoming of our code is in our treatment of the Earth's orientation.

3 Jobs and Positions

PhD scholarships in Solar System Science at the Max Planck Institute for Solar System Research in Göttingen, Germany

S. Schuh[1,2], *IMPRS Scientific Coordinator*
1 Max-Planck-Institut für Sonnensystemforschung, Justus-von-Liebig-Weg 3, 37077 Göttingen, Germany
2 in collaboration with Georg-August-University of Göttingen, Germany

Location: Göttingen, Date: Review of applications begins on 15 November 2014 for starting dates in 2015

The Solar System School invites applications for PhD scholarships in Solar System Science.
The International Max Planck Research School for Solar System Science at the University of Göttingen ("Solar System School") offers a research-oriented doctoral program covering the physical aspects of Solar system science. It is jointly run by the Max Planck Institute for Solar System Research (MPS) and the University of Göttingen. Research at the MPS covers three main research areas: "Sun and heliosphere", "Stellar and Solar Interiors" and "Planets and Comets". Solar System School students collaborate with leading scientists in these fields and graduates are awarded a doctoral degree from the renowned University of Göttingen or, if they choose, another university.
The Solar System School is open to students from all countries and offers an international three-year PhD program in an exceptional research environment with state-of-the-art facilities on the Göttingen Research Campus. Successful applicants receive an attractive scholarship covering relocation support, housing and living expenses and are exempt from tuition fees. The language of the structured graduate program is English, with complimentary German language courses offered (optional). The program includes an inspiring curriculum of scientific lectures and seminars as well as advanced training workshops and provides travel funds to attend international conferences.
Applicants to the Solar System School should have a keen interest in Solar system science and a record of academic excellence. They must have, or must be about to obtain, an M.Sc. degree or equivalent in physics or a related field, including a written Masters thesis (or a scientific publication), and must document a good command of the English language.
Review of applications for a starting date of September 2015 will begin on 15 November 2014, but other starting times are also negotiable. Scholarships are awarded on a competitive basis. The Solar System School is committed to increase the diversity of its student body and particularly encourages applications from members of under-represented groups.

Applications should be prepared following the instructions at `http://www.solar-system-school.de`.

Download/Website: `http://www.solar-system-school.de`

Contact: `info@solar-system-school.de`

SOLAR SYSTEM SCHOOL

2015 NASA Sagan Fellowship Program

Dr. Dawn M. Gelino
NASA Exoplanet Science Institute

NASA Exoplanet Science Institute, Applications Due: Nov. 6, 2014, 4 pm PDT

The NASA Exoplanet Science Institute announces the 2015 Sagan Postdoctoral Fellowship Program and solicits applications for fellowships to begin in the Fall of 2015.

The Sagan Fellowships support outstanding recent postdoctoral scientists to conduct independent research that is broadly related to the science goals of the NASA Exoplanet Exploration area. The primary goal of missions within this program is to discover and characterize planetary systems and Earth-like planets around nearby stars.

The proposed research may be theoretical, observational, or instrumental. This program is open to applicants of any nationality who have earned (or will have earned) their doctoral degrees on or after January 1, 2012, in astronomy, physics, or related disciplines. The fellowships are tenable at U.S. host institutions of the fellows' choice, subject to a maximum of one new fellow per host institution per year. The duration of the fellowship is up to three years: an initial one-year appointment and two annual renewals contingent on satisfactory performance and availability of NASA funds.

The Announcement of Opportunity, which includes detailed program policies and application instructions, is available at the web site: http://nexsci.caltech.edu/sagan/fellowship.shtml

Applicants must follow the instructions given in this Announcement. Applications must be submitted electronically through the above website. Inquiries about the Sagan Fellowships may be directed to saganfellowship@ipac.caltech.edu

The deadline for both applications and letters of reference is Thursday, November 6, 2014. Offers will be made before February 1, 2015 and new appointments are expected to begin on or about September 1, 2015.

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

Contact: `saganfellowship@ipac.caltech.edu`

Assistant Professor of Astronomy

S. Kane
San Francisco State University

San Francisco, California, USA, August 2015

The Department of Physics and Astronomy at San Francisco State University invites applications for a tenure-track assistant professor position to begin Fall 2015. The emphasis of the search is on astronomical instrumentation and laboratory astrophysics; related fields of observational astronomy will also be considered. We seek candidates who will interact with other members of the department's diverse research community. Current faculty members lead active programs in planet formation, exoplanets, stellar populations, galaxy formation, the physics of clusters of galaxies, and the X-ray study of binary stars and astrophysical plasmas. Other department research interests include quantum optics, nanomaterials, cryogenic detectors, and theoretical particle physics. The department shares in the development and operation of the 30" telescope at Leuschner Observatory (in collaboration with the UC Berkeley Astronomy Department) and the WIYN 0.9m telescope on Kitt Peak (as part of the WIYN 0.9m consortium). The submission deadline is Monday, December 1, 2014 at 5PM PST.

Download/Website: `https://academicjobsonline.org/ajo/jobs/4713`

Contact: `skane@sfsu.edu`

Postdoctoral Position in Astrophysics: The formation and evolution of mean-motion resonances in planetary systems

Prof. Ewa Szuszkiewicz
Institute of Physics and CASA*, University of Szczecin, Wielkopolska 15, 70-451 Szczecin, POLAND

Institute of Physics and CASA, position available immediately*

A four-year (2+2) postdoctoral position funded by the Polish National Science Centre through a grant MAESTRO, led by Prof. Ewa Szuszkiewicz, is available immediately at the Astronomy and Astrophysics Group of the Faculty of Mathematics and Physics of the University of Szczecin, Szczecin, Poland. The appointment may be renewed for an additional year, subject to availability of funding. A successful completion of the four-year period may lead to a permanent position. The selected candidate will join the team of Prof. Szuszkiewicz working on the project "The formation and evolution of mean-motion resonances in planetary systems" and will have the possibility of participating in international schools and conferences. Short visits at the University of Toruń and at the DAMTP, University of Cambridge, are also planned.
High-quality candidates are sought with a strong background in astrophysics and numerical simulations. Previous experience in hydrodynamical and magnetohydrodynamical astrophysical calculations is required. Familiarity with $N-$body techniques is desirable. Eligible candidates must hold a PhD degree or equivalent by the starting date of the position.
The Faculty of Mathematics and Physics of the University of Szczecin offers an excellent environment for performing cutting-edge research in astronomy and astrophysics. The Astronomy and Astrophysics Group participates in the projects ASTROGRID-PL (devoted to the formation of an integrated IT platform dedicated to astronomical research), and POLFAR (POlish Low Frequency Array). The Faculty of Mathematics and Physics has also very good computational facilities including a HPC cluster equipped with CPUs and GPUs.
Interested applicants should send as soon as possible a cover letter accompanied with a CV and a brief statement of past research and research interests to Prof. Szuszkiewicz at the e-mail address: szusz@feynman.fiz.univ.szczecin.pl. They should also include the e-mail addresses of 3-4 referees willing to write a letter of reference on their behalf. Applications will be reviewed until the position is filled.
Enquiries about the postdoctoral position and the project should be sent to Prof. Ewa Szuszkiewicz at szusz@feynman.fiz.univ.szczecin.pl

Contact: `szusz@feynman.fiz.univ.szczecin.pl`

4 Conference announcements

45th Saas-Fee Course: From Protoplanetary Disks to Planet Formation

M. Audard[1], Y. Alibert[2], M. R. Meyer[3]
[1] Department of Astronomy, University of Geneva, Switzerland
[2] Center for Space and Habitability, University of Bern, Switzerland
[3] Institute of Astronomy, ETH Zurich, Switzerland

Les Diablerets, Switzerland, 15 to 20 March, 2015

Since 1971 the Swiss Society for Astrophysics and Astronomy has been organizing Saas-Fee advanced course in astrophysics. The topic for the 2015 course will be:

FROM PROTOPLANETARY DISKS TO PLANET FORMATION

The course will take place from 15-20 March 2015 in the Swiss ski resort, Les Diablerets. In the tradition of Saas-Fee courses, three topics will be presented by three speakers for a total of 24 lectures:

- Processes in protoplanetary disks: Prof. Philip J. Armitage
- Observational properties of protoplanetary disks: Dr. Leonardo Testi
- Planet formation and disk-planet interactions: Prof. Willhelm Kley.

The course will, thus, cover the theoretical and observational properties of protoplanetary disks leading to the formation of planets. The main audience of the course is PhD students, postdoctoral scientists from the international community. Members of the SSAA are also welcome. Free time is left in the afternoon for interactions, discussions, skiing, snowshoeing, etc. The number of participants will be limited to about 100 participants.

Registration is now open. Important dates are as follows:

- 30 Nov 2014: Early registration deadline
- 31 Jan 2015: Regular registration & Hotel booking deadlines

Download/Website: `http://isdc.unige.ch/sf2015`

Contact: `sf2015@unige.ch`

NASA Exoplanet Exploration Program Analysis Group Meeting 11

Scott Gaudi[1], *Douglas Hudgins*

[1] The Ohio State University, 4005 McPherson Lab, 140 West 18th Avenue, Columbus, Ohio 43210-1173, USA

[2] NASA

Seattle, WA, January 3-4

NASA's Exoplanet Exploration Program Analysis Group (ExoPAG) will hold its eleventh meeting on Saturday and Sunday, January 3-4, 2015, just before the 225th Meeting of the American Astronomical Society, in Seattle, WA. ExoPAG meetings are open to the entire scientific community, and offer an opportunity to participate in discussions of scientific and technical issues in exoplanet exploration, and to provide input into NASA's Exoplanet Exploration Program (ExEP). All interested members of the astronomical and planetary science communities are invited to attend and participate.

ExoPAG-11 will continue to focus on soliciting input from the wider exoplanet community on ways in which NASA might facilitate exoplanet research over the next few years, as well as input on how it should prioritize its ExEP activities. Suggestions for topics and/or speakers at the meeting along these lines are welcome. There will be reports from the active Study Analysis Groups (SAGs), as well as from the Science Interest Group (SIG) entitled "Toward a Near-Term Exoplanet Community Plan."

The most up-to-date agenda, as well as details of the meeting logistics, can be found on the website listed below. Questions and suggestions can be sent to Scott Gaudi, ExoPAG Chair (gaudi@astronomy.ohio-state.edu), and/or Dr. Douglas Hudgins, ExoPAG Executive Secretary (Douglas.M.Hudgins@nasa.gov). General news and information about NASA's ExoPAG can also be found on the website.

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

Contact: `gaudi@astronomy.ohio-state.edu`

IAU Focus Meeting: Exoplanets & Statistics

S. Aigrain[1], *E. Feigelson*[2]
[1] Department of Physics, University of Oxford, UK
[2] Pennsylvania State University, USA

IAU General Assembly XXIX, Honolulu, Hawaii, 3–5 August 2015

The discovery and characterization of exoplanets requires both superbly accurate instrumentation and sophisticated statistical methods. Weak or rare planetary signals must be extracted from dominant starlight, very large samples and noisy datasets. This meeting will bring together exoplanet and statistical experts to discuss and address key challenges in exoplanet detection (including radial velocity, astrometry, transits, direct imaging and microlensing), detailed planet characterization, and population studies.

The program will consist of invited talks by leading astronomers and statisticians at the forefront of exoplanet detection and characterization, contributed posters and talks, and discussion. A day of hands-on tutorial-style experimentation with key algorithms and software packages will follow the meeting. For more information, see the website `www.exostats.org`.

Interested scientists can register, submit abstracts, arrange lodging and logistics through the IAU General Assembly website (`www.astronomy2015.org`). Early registration is open until 1 Dec 2015.

We look forward to a productive cross-disciplinary exchange of ideas on the methodology of exoplanetary discovery and science, and hope to see many of you there.

S. Aigrain & E. Feigelson on behalf of the SOC.

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

PLATO 2.0 Science Conference

I. Pagano
INAF, Osservatorio Astrofisico di Catania, via Santa Sofia 78, I-95125 Catania, Italy

Taormina, Italy, 3 to 5 December, 2014

PLATO 2.0, the third medium class mission in the ESA Cosmic Vision 2015-2025 program, is a survey project with the prime goals to detect planets down to Earth size and characterize the bulk planet parameters for a large sample of planets with orbital distances up to the habitable zone of solar-like stars.

With the launch scheduled in 2024, PLATO 2.0 will build on the foundations provided by CoRoT, Kepler and the forthcoming TESS and CHEOPS missions.

The goal of the conference is to bring together experts of the exoplanet and stellar physic communities already involved or willing to collaborate to the preparation of the mission to share ideas and expertise and to highlight the potential contribution of PLATO 2.0 to the (exo-)planetology in the next decades.

The program envisages invited talks, oral contributions and posters. There will be time for discussions.

Oral and poster contributions can be submitted through the registration form.

SOC: C. Aerts, T. Appourchaux, W. Benz, A. Brandeker, J. Christensen Dalsgaard, M. Deleuil, L. Gizon, P. Gondoin, M.-J. Goupil, M. Güdel, E. Janot-Pacheco, A. Heras, M. Mass-Hesse, I. Pagano, G. Piotto, D. Pollacco (Chair), R. Ragazzoni, H. Rauer, N. Santos, A. Smith, J.-C. Suarez, R. Szabo, S. Udry

LOC: G. Bellassai, M. Dima, V. Granata, G. Leto, A. F. Lanza, A.C. Lanzafame, E. Martinetti, M. Munari, I. Pagano (chair), L. Prisinzano, G. Scandariato, S. Spinella.

Registration is now open

Download/Website: `http://www.oact.inaf.it/plato/PPLC/PLATO_Meetings/Entries/2014/12/2_PLATO_2014_in_Taormina.html`

Contact: `plato@inaf.it`

5 As seen on astro-ph

The following list contains all the entries relating to exoplanets that we spotted on astro-ph during September 2014. If you see any that we missed, please let us know and we'll include them in the next issue.

astro-ph/1409.0011 : **Stability of the Kepler-11 System and its Origin** by *Nikhil Mahajan, Yanqin Wu*
astro-ph/1409.0021 : **Disentangling Planets and Stellar Activity for Gliese 667C** by *Paul Robertson, Suvrath Mahadevan*
astro-ph/1409.0026 : **Gaseous Mean Opacities for Giant Planet and Ultracool Dwarf Atmospheres over a Range of Metallicities and Temperatures** by *Richard S. Freedman, et al.*
astro-ph/1409.0372 : **Dynamical corotation torques on low-mass planets** by *Sijme-Jan Paardekooper*
astro-ph/1409.0519 : **Magnetic Effects in Hot Jupiter Atmospheres** by *Tamara M. Rogers, Thaddeus D. Komacek*
astro-ph/1409.0532 : **Understanding the assembly of Kepler's compact planetary systems** by *T. O. Hands, R. D. Alexander, W. Dehnen*
astro-ph/1409.0572 : **Herschel/PACS photometry of transiting-planet host stars with candidate warm debris disks** by *Bruno Merín, et al.*
astro-ph/1409.0639 : **Effects of XUV radiation on circumbinary planets** by *J. Sanz-Forcada, S. Desidera, G. Micela*
astro-ph/1409.0710 : **Is the HD 15115 inner disk really asymmetrical ?** by *J. Mazoyer, et al.*
astro-ph/1409.0730 : **Heating efficiency in hydrogen-dominated upper atmospheres** by *Valery I. Shematovich, Dmitry E. Ionov, Helmut Lammer*
astro-ph/1409.0890 : **Exoplanet hosts reveal lithium depletion: Results from a homogeneous statistical analysis** by *P. Figueira, et al.*
astro-ph/1409.0891 : **The MEarth-North and MEarth-South transit surveys: searching for habitable super-Earth exoplanets around nearby M-dwarfs** by *Jonathan M. Irwin, et al.*
astro-ph/1409.1051 : **Geology and Photometric Variation of Solar System Bodies with Minor Atmospheres: Implications for Solid Exoplanets** by *Yuka Fujii, et al.*
astro-ph/1409.1226 : **The Kozai-Lidov Mechanism in Hydrodynamical Disks** by *Rebecca G. Martin, et al.*

astro-ph/1409.1249 : **Most Sub-Arcsecond Companions of Kepler Exoplanet Candidate Host Stars are Gravitationally Bound** by *Elliott P. Horch, et al.*

astro-ph/1409.1250 : **High Resolution Transmission Spectroscopy as a Diagnostic for Jovian Exoplanet Atmospheres: Constraints from Theoretical Models** by *Eliza M.-R. Kempton, Rosalba Perna, Kevin Heng*

astro-ph/1409.1349 : **Predicting a third planet in the Kepler-47 circumbinary system** by *Tobias C. Hinse, et al.*

astro-ph/1409.1366 : **Automated preparation of Kepler time series of planet hosts for asteroseismic analysis** by *R. Handberg, M. N. Lund*

astro-ph/1409.1368 : **An Orbital Stability Study of the Proposed Companions of SW Lyncis** by *Tobias C. Hinse, Jonathan Horner, Robert A. Wittenmyer*

astro-ph/1409.1595 : **Advances in exoplanet science from Kepler** by *Jack J. Lissauer, Rebekah I. Dawson, Scott Tremaine*

astro-ph/1409.1605 : **KIC 9632895 - The 10th Kepler Transiting Circumbinary Planet** by *William F. Welsh, et al.*

astro-ph/1409.1850 : **Astrometric follow-up observations of directly imaged sub-stellar companions to young stars and brown dwarfs** by *C. Ginski, et al.*

astro-ph/1409.1904 : **Exploring Exoplanet Populations with NASA's Kepler Mission** by *Natalie M. Batalha*

astro-ph/1409.2312 : **Tau-REx I: A next generation retrieval code for exoplanetary atmospheres** by *Ingo P. Waldmann, et al.*

astro-ph/1409.2473 : **Methanol Along the Path from Envelope to Protoplanetary Disc** by *Maria N. Drozdovskaya, et al.*

astro-ph/1409.2493 : **Formation of planetary debris discs around white dwarfs I: Tidal disruption of an extremely eccentric asteroid** by *Dimitri Veras, et al.*

astro-ph/1409.2504 : **Toward the Detection of Exoplanet Transits with Polarimetry** by *Sloane J. Wiktorowicz, Gregory P. Laughlin*

astro-ph/1409.2506 : **On the role of GRBs on life extinction in the Universe** by *Tsvi Piran, Raul Jimenez*

astro-ph/1409.2511 : **Hall-effect Controlled Gas Dynamics in Protoplanetary Disks: II. Full 3D Simulations toward the Outer Disk** by *Xue-Ning Bai*

astro-ph/1409.2541 : **Spherically Symmetric Gravitational Collapse of a Clump of Solids in a Gas** by *Karim Shariff, Jeffrey N. Cuzzi*

astro-ph/1409.2759 : **NASA ExoPAG Study Analysis Group 11: Preparing for the WFIRST Microlensing Survey** by *Jennifer C. Yee, et al.*

astro-ph/1409.2775 : **Ks band secondary eclipses of WASP-19b and WASP-43b with the Anglo-Australian Telescope** by *G. Zhou, et al.*

astro-ph/1409.2869 : **SPOTS: The Search for Planets Orbiting Two Stars. I. Survey description and first observations** by *Christian Thalmann, et al.*

astro-ph/1409.2879 : **Planetary population synthesis coupled with atmospheric escape: a statistical view of evaporation** by *Sheng Jin, et al.*

astro-ph/1409.2886 : **On the Frequency of Potential Venus Analogs from Kepler Data** by *Stephen R. Kane, Ravi Kumar Kopparapu, Shawn D. Domagal-Goldman*

astro-ph/1409.2946 : **Near 3:2 and 2:1 mean motion resonances formation in the systems observed by Kepler** by *Su Wang, Jianghui Ji*

astro-ph/1409.2982 : **How Rocky Are They? The Composition Distribution of Kepler's Sub-Neptune Planet Candidates within 0.15 AU** by *Angie Wolfgang, Eric Lopez*

astro-ph/1409.3247 : **Chaotic Dynamics of Stellar Spin in Binaries and the Production of Misaligned Hot Jupiters** by *Natalia I. Storch, Kassandra R. Anderson, Dong Lai*

astro-ph/1409.3320 : **The period ratio distribution of Kepler's candidate multiplanet systems** by *Jason H. Steffen, Jason A. Hwang*

astro-ph/1409.3449 : **BinHab: A Numerical Tool for the Calculation of S/P-Type Habitable Zones in Binary**

Systems by *Manfred Cuntz, Robert Bruntz*

astro-ph/1409.3578 : **Make Super-Earths, Not Jupiters: Accreting Nebular Gas onto Solid Cores at 0.1 AU and Beyond** by *Eve J. Lee, Eugene Chiang, Chris W. Ormel*

astro-ph/1409.3796 : **S-Type and P-Type Habitability in Stellar Binary Systems: A Comprehensive Approach. II. Elliptical Orbits** by *Manfred Cuntz*

astro-ph/1409.4000 : **Water vapor in the spectrum of the extrasolar planet HD 189733b: 2. The eclipse** by *Nicolas Crouzet, et al.*

astro-ph/1409.4038 : **A global analysis of Spitzer and new HARPS data confirms the loneliness and metal-richness of GJ 436 b** by *A. A. Lanotte, et al.*

astro-ph/1409.4152 : **A Bayesian Analysis of HAT-P-7b Using the EXONEST Algorithm** by *Ben Placek, Kevin H. Knuth*

astro-ph/1409.4412 : **Post-main-sequence debris from rotation-induced YORP break-up of small bodies** by *Dimitri Veras, Seth A. Jacobson, Boris T. Gaensicke*

astro-ph/1409.4459 : **Optimal Measures for Characterizing Water-rich Super-Earths** by *Nikku Madhusudhan, Seth Redfield*

astro-ph/1409.4592 : **Characterization of the Kepler-101 planetary system with HARPS-N. A hot super-Neptune with an Earth-sized low-mass companion** by *A.S. Bonomo, et al.*

astro-ph/1409.4603 : **Macroscopic Dust in Protoplanetary Disks - From Growth to Destruction** by *Johannes Deckers, Jens Teiser*

astro-ph/1409.4758 : **Binary Formation in Planetesimal Disks II. Planetesimals with Mass Spectrum** by *Junko D. Kominami, Junichiro Makino*

astro-ph/1409.4774 : **Barycentric Corrections at 1 cm/s for precise Doppler velocities** by *J. T. Wright, J. D. Eastman*

astro-ph/1409.4779 : **IAS15: A fast, adaptive, high-order integrator for gravitational dynamics, accurate to machine precision over a billion orbits** by *Hanno Rein, David S. Spiegel*

astro-ph/1409.5108 : **Atmospheric Circulation of Eccentric Hot Jupiter HAT-P-2b** by *Nikole K. Lewis, et al.*

astro-ph/1409.5128 : **Maximizing the ExoEarth Candidate Yield from a Future Direct Imaging Mission** by *Christopher C. Stark, et al.*

astro-ph/1409.5134 : **Deep Thermal Infrared Imaging of HR 8799 bcde: New Atmospheric Constraints and Limits on a Fifth Planet** by *Thayne Currie, et al.*

astro-ph/1409.5148 : **The Turbulent Origin of Spin-Orbit Misalignment in Planetary Systems** by *Drummond B. Fielding, et al.*

astro-ph/1409.5266 : **Instrumentation for the detection and characterization of exoplanets** by *Francesco Pepe, David Ehrenreich, Michael R. Meyer*

astro-ph/1409.5268 : **On the diversity of magnetic interactions in close-in star-planet systems** by *Antoine Strugarek, et al.*

astro-ph/1409.5336 : **New Analysis Indicates No Thermal Inversion in the Atmosphere of HD 209458b** by *Hannah Diamond-Lowe, et al.*

astro-ph/1409.5456 : **Gemini Planet Imager Spectroscopy of the HR 8799 planets c and d** by *Patrick Ingraham, et al.*

astro-ph/1409.5525 : **The Polytrope Index Revealed: Implications for Planet, Solar and Material Models** by *S. P. Weppner, et al.*

astro-ph/1409.5668 : **Reliable inference of exoplanet light curve parameters using deterministic and stochastic systematics models** by *Neale P. Gibson*

astro-ph/1409.5740 : **Characterizing Earth-like Planets Using a Combination of High-Dispersion Spectroscopy and High-Contrast Instruments: Doppler-shifted Water and Oxygen Lines** by *Hajime Kawahara*

astro-ph/1409.6115 : **Keplerian periodogram for Doppler exoplanets detection: optimized computation and analytic significance thresholds** by *Roman V. Baluev*

astro-ph/1409.6143 : **A near-infrared interferometric survey of debris-disc stars. IV. An unbiased sample of 92 southern stars observed in H-band with VLTI/PIONIER** by *Steve Ertel, et al.*
astro-ph/1409.6335 : **The well-aligned orbit of WASP-84b: evidence for disc migration** by *D. R. Anderson, et al.*
astro-ph/1409.6544 : **Magnetically Controlled Outflows from Planets** by *Fred C. Adams, James E. Owen*
astro-ph/1409.6650 : **Numerical Simulations of Collisional Disruption of Rotating Gravitational Aggregates: Dependence on Material Properties** by *Ronald-Louis Ballouz, et al.*
astro-ph/1409.6821 : **The Dawes Review 3: The Atmospheres of Extrasolar Planets and Brown Dwarfs** by *Jeremy Bailey*
astro-ph/1409.6868 : **Insights on the dynamical history of the Fomalhaut system - Investigating the Fom c hypothesis** by *Virginie Faramaz, et al.*
astro-ph/1409.6975 : **Kepler detection of a new extreme planetary system orbiting the subdwarf-B pulsator KIC10001893** by *R. Silvotti, et al.*
astro-ph/1409.7021 : **The Mass Budget of Planet Forming Discs: Isolating the Epoch of Planetesimal Formation** by *J. R. Najita, S. J. Kenyon*
astro-ph/1409.7027 : **Electrodynamics on extrasolar giant planets** by *T. T. Koskinen, et al.*
astro-ph/1409.7041 : **Terrestrial planet formation in low-mass disks: dependence with initial conditions** by *María Paula Ronco, Gonzalo Carlos de Elía, Octavio Miguel Guilera*
astro-ph/1409.7072 : **Discriminating Between Cloudy, Hazy and Clearsky Exoplanets Using Refraction** by *Amit Misra, Victoria Meadows*
astro-ph/1409.7102 : **Planetesimal fragmentation and giant planet formation: the role of planet migration** by *O. M. Guilera, et al.*
astro-ph/1409.7110 : **Constraints on photoevaporation models from (lack of) radio emission in the Corona Australis protoplanetary disks** by *Roberto Galván-Madrid et al.*
astro-ph/1409.7245 : **How to determine an exomoon's sense of orbital motion** by *René Heller, Simon Albrecht*
astro-ph/1409.7320 : **Highlights in the Study of Exoplanet Atmospheres** by *Adam Burrows*
astro-ph/1409.7328 : **On the filtering and processing of dust by planetesimals 1. Derivation of collision probabilities for non-drifting planetesimals** by *Tristan Guillot, Shigeru Ida, Chris W. Ormel*
astro-ph/1409.7415 : **CHARIS Science: Performance Simulations for the Subaru Telescope's Third-Generation of Exoplanet Imaging Instrumentation** by *Timothy D. Brandt, et al.*
astro-ph/1409.7429 : **A planetary system and a highly eccentric brown dwarf around the giant stars HIP67851 and HIP97233** by *M. I. Jones, et al.*
astro-ph/1409.7477 : **Evolution of Exoplanets and their Parent Stars** by *Tristan Guillot et al.*
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