ExoPlanet News
An Electronic Newsletter

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Contents

1 Editorial

Welcome to the forty-ninth edition of ExoPlanet News.

We're pleased to present another selection of excellent abstracts this month covering a wide range of exoplanet science. It's also encouraging to see a good selection of jobs and conferences coming up.

The next edition of the newsletter - our fiftieth! - is planned for the beginning of June 2012, so please send anything relevant to exoplanet@open.ac.uk, and it will appear then. Remember that past editions of this newsletter, submission templates and other information can be found at the ExoPlanet News website: http://exoplanet.open.ac.uk.

Best wishes
Andrew Norton & Glenn White
The Open University

2 Abstracts of refereed papers

WASP-44b, WASP-45b and WASP-46b: three short-period, transiting extrasolar planets

D. R. Anderson[1], A. Collier Cameron[2], M. Gillon[3], C. Hellier[1], E. Jehin[3], M. Lendl[4], P. F. L. Maxted[1], D. Queloz[4], B. Smalley[1], A. M. S. Smith[1], A. H. M. J. Triaud[4], R. G. West[5], F. Pepe[4], D. Pollacco[6], D. Ségransan[4], I. Todd[6], and S. Udry[4]

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[2] SUPA, School of Physics and Astronomy, University of St. Andrews, North Haugh, Fife, KY16 9SS, UK
[3] Institut d'Astrophysique et de Géophysique, Université de Liège, Allée du 6 Août, 17, Bat. B5C, Liège 1, Belgium
[4] Observatoire de Genève, Université de Genève, 51 Chemin des Maillettes, 1290 Sauverny, Switzerland
[5] Department of Physics and Astronomy, University of Leicester, Leicester, LE1 7RH, UK
[6] Astrophysics Research Centre, School of Mathematics & Physics, Queen's University, University Road, Belfast, BT7 1NN, UK

Monthly Notices of the Royal Astronomical Society, in press (arXiv:1105.3179)

We report the discovery of three extrasolar planets that transit their moderately bright (m_V = 12–13) host stars. WASP-44b is a 0.89-$M_{\rm Jup}$ planet in a 2.42-day orbit around a G8V star. WASP-45b is a 1.03-$M_{\rm Jup}$ planet which passes in front of the limb of its K2V host star every 3.13 days. Weak Ca II H+K emission seen in the spectra of WASP-45 suggests the star is chromospherically active. WASP-46b is a 2.10-$M_{\rm Jup}$ planet in a 1.43-day orbit around a G6V star. Rotational modulation of the light curves of WASP-46 and weak Ca II H+K emission in its spectra show the star to be photospherically and chromospherically active.

We imposed circular orbits in our analyses as the radial velocity data are consistent with (near-)circular orbits, as could be expected from both empirical and tidal-theory perspectives for such short-period, ∼Jupiter-mass planets. We discuss the impact of fitting for eccentric orbits for such planets when not supported by the data. The derived planetary and stellar radii depend on the fitted eccentricity and these parameters inform intense theoretical efforts concerning tidal circularisation and heating, bulk planetary composition and the observed systematic errors in planetary and stellar radii. As such, we recommend exercising caution in fitting the orbits of short period, ∼Jupiter-mass planets with an eccentric model when there is no evidence of non-circularity.

Download/Website: `http://arxiv.org/abs/1105.3179`

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

An Analytic Method to determine Habitable Zones for S-Type Planetary Orbits in Binary Star Systems

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Astrophysical Journal, in press

With more and more extrasolar planets discovered in and around binary star systems, questions concerning the determination of the classical Habitable Zone arise. Do the radiative and gravitational perturbations of the second star influence the extent of the Habitable Zone significantly, or is it sufficient to consider the host-star only? In this article we investigate the implications of stellar companions with different spectral types on the insolation a terrestrial planet receives orbiting a Sun-like primary. We present time independent analytical estimates and compare these to insolation statistics gained via high precision numerical orbit calculations. Results suggest a strong dependence of permanent habitability on the binary's eccentricity, as well as a possible extension of Habitable Zones towards the secondary in close binary systems.

Download/Website: `http://arxiv.org/abs/1204.2496`

Contact: `siegfried.eggl@univie.ac.at, elke.pilat-lohinger@univie.ac.at`

Comparing HARPS and Kepler surveys: The alignment of multiple-planet systems

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[1] Centro de Astrofísica, Universidade do Porto, Rua das Estrelas, 4150-762 Porto, Portugal
[2] Observatoire Astronomique de lUniversité de Genève, 51 Ch. des Maillettes, - Sauverny - CH1290, Versoix, Suisse
[3] Departamento de Física e Astronomia, Faculdade de Ciências, Universidade do Porto, Portugal

Astronomy & Astrophysics, in press

Aims. We study a subset of the planetary population characterized both by HARPS and Kepler surveys. We compare the statistical properties of planets in systems with $m.sini$ >5-10 $M_\oplus$ and R>2 $R_\oplus$. If we assume that the underlying population has the same characteristics, the different detection sensitivity to the orbital inclination relative to the line of sight allows us to probe the planets' mutual inclination.
Methods. We considered the frequency of systems with one, two and three planets as dictated by HARPS data. We used Kepler's planetary period and host mass and radii distributions (corrected from detection bias) to model planetary systems in a simple yet physically plausible way. We then varied the mutual inclination between planets in a system according to different prescriptions (completely aligned, Rayleigh distributions and isotropic) and compared the transit frequencies with one, two or three planets with those measured by Kepler.
Results. The results show that the two datasets are compatible, a remarkable result especially because there are no tunable knobs other than the assumed inclination distribution. For $m.sini$ cutoffs of 7-10 $M_\oplus$, which are those expected to correspond to the radius cutoff of 2 $R_\oplus$, we conclude that the results are better described by a Rayleigh distribution with mode of 1^o or smaller. We show that the best-fit scenario only becomes a Rayleigh distribution with mode of 5^o if we assume a rather extreme mass-radius relationship for the planetary population.
Conclusions. These results have important consequences for our understanding of the role of several proposed formation and evolution mechanisms. They confirm that planets are likely to have been formed in a disk and show that most planetary systems evolve quietly without strong angular momentum exchanges (abridged).

Download/Website: `http://arxiv.org/abs/1202.2801`

Contact: `pedro.figueira@astro.up.pt`

Dynamical analysis and constraints for the HD 196885 system

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[2] Astronomie et Systèmes Dynamiques, IMCCE-CNRS UMR8028, 77 Av. Denfert-Rochereau, 75014 Paris, France
[3] Centro de Astrofísica, Universidade do Porto, Rua das Estrelas, 4150-762 Porto, Portugal

Astronomy & Astrophysics, in press (arXiv:1203.5249)

The HD 196885 system is composed of a binary star and a planet orbiting the primary. The orbit of the binary is fully constrained by astrometry, but for the planet the inclination with respect to the plane of the sky and the longitude of the node are unknown. Here we perform a full analysis of the HD 196885 system by exploring the two free parameters of the planet and choosing different sets of angular variables. We find that the most likely configurations for the planet are either nearly coplanar orbits (prograde and retrograde), or highly inclined orbits near the Lidov-Kozai equilibrium points, $i = 44^\circ$ or $i = 137^\circ$. Among coplanar orbits, the retrograde ones appear to be less chaotic, while for the orbits near the Lidov-Kozai equilibria, those around $\omega = 270^\circ$ are more reliable, where ω_k is the argument of pericenter of the planet's orbit with respect to the binary's orbit. From the observer's point of view (plane of the sky) stable areas are restricted to $(I_1, \Omega_1) \sim (65^\circ, 80^\circ)$, $(65^\circ, 260^\circ)$, $(115^\circ, 80^\circ)$, and $(115^\circ, 260^\circ)$, where I_1 is the inclination of the planet and Ω_1 is the longitude of ascending node.

Download/Website: `http://arxiv.org/abs/1203.5249`

Contact: `cristian@ua.pt`

Rotating Stars and Revolving Planets: Bayesian Exploration of the Pulsating Sky

Thomas J. Loredo
Department of Astronomy, Cornell University, Ithaca NY, USA

Bayesian Statistics 9, published (2011arXiv1107.5805L)

I describe ongoing work on development of Bayesian methods for exploring periodically varying phenomena in astronomy, addressing two classes of sources: pulsars, and extrasolar planets (exoplanets). For pulsars, the methods aim to detect and measure periodically varying signals in data consisting of photon arrival times, modeled as non-homogeneous Poisson point processes. For exoplanets, the methods address detection and estimation of planetary orbits using observations of the reflex motion "wobble" of a host star, including adaptive scheduling of observations to optimize inferences.

Contact: `loredo@astro.cornell.edu`

Bayesian methods for analysis and adaptive scheduling of exoplanet observations

Thomas J. Loredo[1], *James O. Berger*[2], *David F. Chernoff*[1], *Merlise A. Clyde*[2], *Bin Liu*[3]

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[2] Department of Statistical Science, Duke University, USA
[3] Kuang-Chi Institute of Advanced Technology, China

Statistical Methodology, published (2011arXiv1108.0020L)

We describe work in progress by a collaboration of astronomers and statisticians developing a suite of Bayesian data analysis tools for extrasolar planet (exoplanet) detection, planetary orbit estimation, and adaptive scheduling of observations. Our work addresses analysis of stellar reflex motion data, where a planet is detected by observing the "wobble" of its host star as it responds to the gravitational tug of the orbiting planet. Newtonian mechanics specifies an analytical model for the resulting time series, but it is strongly nonlinear, yielding complex, multimodal likelihood functions; it is even more complex when multiple planets are present. The parameter spaces range in size from few-dimensional to dozens of dimensions, depending on the number of planets in the system, and the type of motion measured (line-of-sight velocity, or position on the sky). Since orbits are periodic, Bayesian generalizations of periodogram methods facilitate the analysis. This relies on the model being linearly separable, enabling partial analytical marginalization, reducing the dimension of the parameter space. Subsequent analysis uses adaptive Markov chain Monte Carlo methods and adaptive importance sampling to perform the integrals required for both inference (planet detection and orbit measurement), and information-maximizing sequential design (for adaptive scheduling of observations). We present an overview of our current techniques and highlight directions being explored by ongoing research.

Contact: `loredo@astro.cornell.edu`

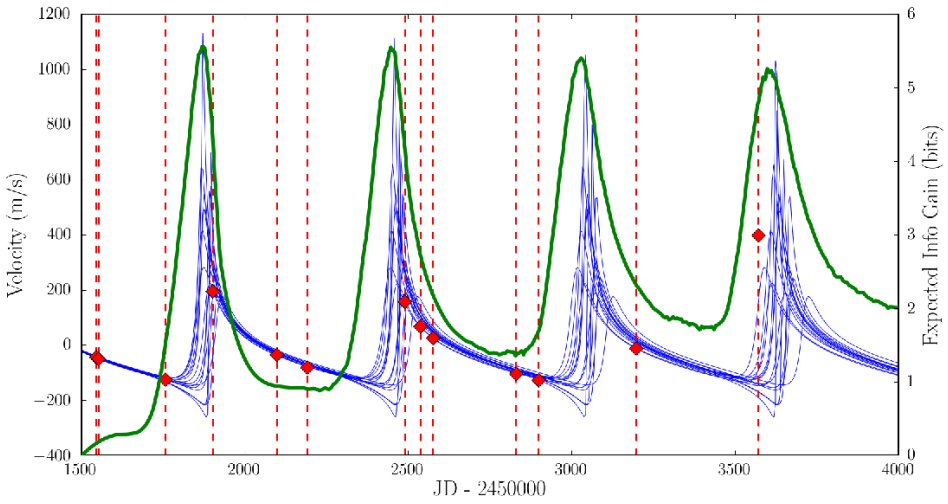

Figure 1: (Loredo et al.) Relative expected information gain for a single future observation of HD 222582 for times ≈ 4 orbits after after the observations of Vogt et al. (2000) (thick green curve, right axis), with 15 representative velocity models (thin blue curves, left axis). Red diamonds indicated the the subsequent 13 observations of Butler et al. (2006), at times indicated by vertical dashed red lines.

Nebular water depletion as the cause of Jupiter's low oxygen abundance

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Astrophysical Journal Letters, in press

Motivated by recent spectroscopic observations suggesting that atmospheres of some extrasolar giant-planets are carbon-rich, i.e. carbon/oxygen ratio (C/O) $\geq$ 1, we find that the whole set of compositional data for Jupiter is consistent with the hypothesis that it be a carbon-rich giant planet. We show that the formation of Jupiter in the cold outer part of an oxygen-depleted disk (C/O $\sim$1) reproduces the measured Jovian elemental abundances at least as well as the hitherto canonical model of Jupiter formed in a disk of solar composition (C/O = 0.54). The resulting O abundance in Jupiter's envelope is then moderately enriched by a factor of $\sim$2 $\times$ solar (instead of $\sim$7 $\times$ solar) and is found to be consistent with values predicted by thermochemical models of the atmosphere. That Jupiter formed in a disk with C/O $\sim$1 implies that water ice was heterogeneously distributed over several AU beyond the snow line in the primordial nebula and that th e fraction of water contained in icy planetesimals was a strong function of their formation location and time. The Jovian oxygen abundance to be measured by NASA's Juno mission en route to Jupiter will provide a direct and strict test of our predictions.

Download/Website: `http://arxiv.org/pdf/1204.3887.pdf`

Contact: `olivier.mousis@obs-besancon.fr`

Rapid Coagulation of Porous Dust Aggregates Outside the Snow Line: A Pathway to Successful Icy Planetesimal Formation

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[3] Planetary Exploration Research Center, Chiba Institute of Technology, Narashino, Chiba 275-0016, Japan

Astrophysical Journal, in press (arXiv:1204.5035)

Rapid orbital drift of macroscopic dust particles is one of the major obstacles against planetesimal formation in protoplanetary disks. We reexamine this problem by considering porosity evolution of dust aggregates. We apply a porosity model based on recent N-body simulations of aggregate collisions, which allows us to study the porosity change upon collision for a wide range of impact energies. As a first step, we neglect collisional fragmentation and instead focus on dust evolution outside the snow line, where the fragmentation has been suggested to be less significant than inside the snow line because of the high sticking efficiency of icy particles. We show that dust particles can evolve into highly porous aggregates (with internal densities of much less than $0.1\ \mathrm{g\ cm^{-3}}$) even if collisional compression is taken into account. We also show that the high porosity triggers significant acceleration in collisional growth. This acceleration is a natural consequence of particles' aerodynamical property at low Knudsen numbers, i.e., at particle radii larger than the mean free path of the gas molecules. Thanks to this rapid growth, the highly porous aggregates are found to overcome the radial drift barrier at orbital radii less than 10 AU (assuming the minimum-mass solar nebula model). This suggests that, if collisional fragmentation is truly insignificant, formation of icy planetesimals is possible via direct collisional growth of submicron-sized icy particles.

Download/Website: `http://arxiv.org/abs/1204.5035`

Contact: `okuzumi@nagoya-u.jp`

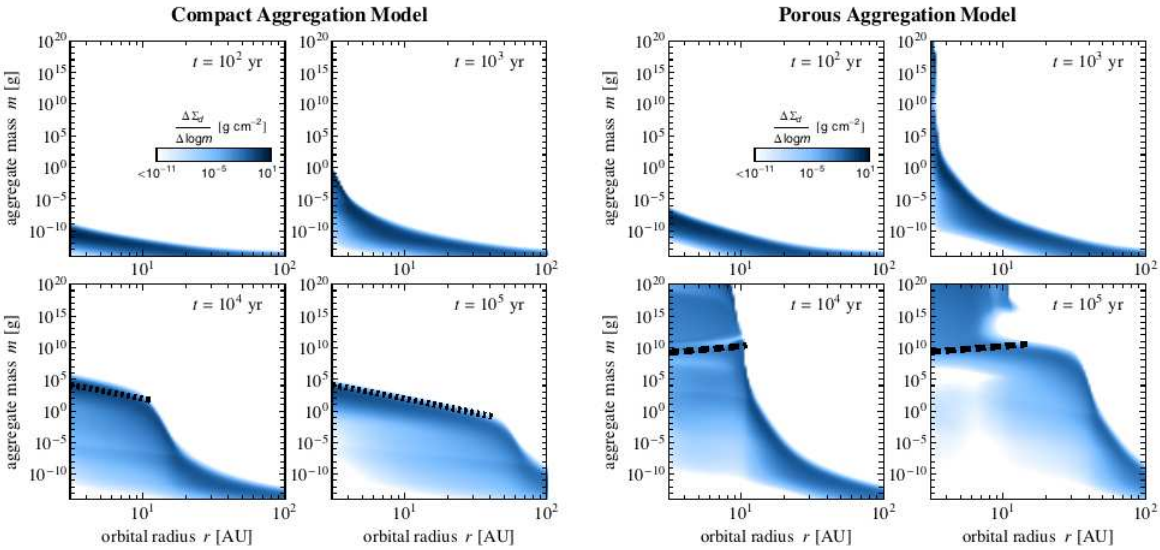

Figure 2: (Okuzumi et al.) Temporal evolution of the global aggregate size distribution for compact aggregation (left four panels) and for porous aggregation (right four panels). Porous aggregates are found to grow across the "radial drift barrier" (dashed lines) at < 10 AU because of rapid coagulation in the Stokes drag regime.

3 Jobs and Positions

Professor or Associate Professor position in Exoplanets

Professor Isabelle Baraffe
Astrophysics Group, University of Exeter, Stocker Road, Exeter, EX4 4QL

University of Exeter, closing date: 2 July 2012

The College of Engineering, Mathematics and Physical Sciences invites applications for a Professor or Associate Professor position in Astrophysics at the University of Exeter.

This post aims to expand current research performed in the Astrophysics group at the University of Exeter (http://www.astro.ex.ac.uk/), in areas related or complementary to star and planet formation, hydrodynamical and MHD processes in stars and planets, extra-solar planets and planetary atmospheres. Candidates in theoretical, observational or computational astrophysics and in other interdisciplinary fields related to astrophysics will be considered. The group has strong links with Applied Mathematics at the University of Exeter and with the Met Office (also in Exeter). Suitable candidates will bring research that will expand and strengthen astrophysics at the University.

We are looking for innovative researchers with an international reputation and with a strong track record of research funding and international quality publications. The successful candidate will have the ability to attract world-class researchers and students and will contribute to relevant areas of teaching as appropriate.

The Professor remuneration will reflect the international quality of the person we seek to appoint. Associate Professor starting salary will be £51,424 - £64,788 per annum on Grade H.

Applicants are encouraged to contact the Dean of the College, Prof Ken Evans (tel: 01392-723645, email: K.E.Evans@exeter.ac.uk) to discuss the posts further. Informal enquiries can be made to Prof Isabelle Baraffe (tel 01392 725123 email: I.Baraffe@exeter.ac.uk). You may also wish to consult our web site at emps.exeter.ac.uk/research for further details of the College.

For further details and to apply on line visit www.exeter.ac.uk/jobs, searching under reference number R11166

The closing date for completed applications is midnight on 2 July 2012.

Download/Website: `http://emps.exeter.ac.uk/research`

Contact: `i.baraffe@ex.ac.uk`

Postdoctoral Position in Theoretical Astrophysics/Planetary Sciences

Willy Benz
Physics Institute & Center for Space and Habitability, University of Bern, Switzerland

Bern, Switzerland, October 1, 2012

The group for Space Research and Planetary Sciences at the Physikalisches Institut at the University of Bern, Switzerland, invites applications for a Research Associate (postdoc) appointment starting on October 1, 2012. A somewhat later starting date can also be considered if desired.

The successful applicant is expected to be a recent PhD recipient in theoretical astrophysics and/or planetary sciences. Fields of particular interests to the group include the theory of formation and/or evolution of giant and/or terrestrial planets. He/she should be able to carry out independent research as well as to participate actively in the other activities of the department.

Salary is according to qualifications and conditions stipulated by the University of Bern. The appointment will be for a period of two years, renewable for an additional year.

Interested candidates should send a curriculum vitae, a list of publications, a description of current and planned research activities, and the contact details of three referees to Willy Benz before June 15, 2012.

Contact: `wbenz@space.unibe.ch`

4 Conference announcements

Exoplanets in Multi-body Systems in the Kepler Era

Eric Ford & Nader Haghighipour

Aspen Center for Physics, CO, USA, February 9–16, 2013

Rationale: For centuries, theories of planet formation were guided exclusively by our solar system. However, the discovery of planets orbiting other stars (exoplanets) in the past two decades has demonstrated that nature often produces planetary systems quite different from our own, neither anticipated by nor well explained by the current theories of solar system formation and dynamics. The diversity of planetary system architectures (the masses and orbital arrangements of planets) has confronted astronomers with many new challenges and reinvigorated the fields of planet formation and orbital dynamics. Among these challenges are planetary systems with multiple planets in close-in orbits, highly eccentric orbits, and planets in binary star systems. In this one week program, scientists from the fields of planetary science, celestial mechanics, astronomy and astrophysics will meet to discuss new developments in the field of extrasolar multi-planet systems. The goal of our workshop is to provide an environment where these scientists can present new ideas, discuss their implications for identifying the most important problems in the field and chart the fields future direction.

Practical Details: The meeting will be held either February 9-15 or February 10-16, 2013. We anticipate nearly 100 participants. The Aspen Center for Physics will coordinate applications, registration and housing. We will update the meeting website with information about how to apply, registration and housing as these details are available. In the meantime, you may see the ACP website for further information about registration, housing and day care for previous winter meetings. Young scientists, women and underrepresented minorities are all encouraged to apply.

Download/Website: `http://www.astro.ufl.edu/ eford/meetings/aspen2013/`

Contact: `acp2012-soc@astro.ufl.edu`

Protostars and Planets VI: Call for Papers

Henrik Beuther, Ralf Klessen, Kees Dullemond, Thomas Henning

[1] Max Planck Institute for Astronomy, Königstuhl 17, 69117 Heidelberg, Germany
[2] Institute for Theoretical Astrophysics, Alber-Ueberle-Strasse 2, 69120 Heidelberg, Germany

Heidelberg, Germany, 15 - 20 July 2013

The Protostars and Planets series has served the community for more than three decades with state of the art compilations of the current knowledge in the fields of star and planet formation. The previous volume PPV was published in 2007. Since then, the field of protostars and planets has advanced tremendously, from a theoretical as well as observational point of view.
The next Protostars and Planets conference will take place in Heidelberg, Germany, July 15 - 20, 2013. For more details about schedule and location, please visit the conference web-page www.ppvi.org.
A primary outcome of the conference will be the Protostars and Planets VI book of review articles. Although the meeting is still more than one year ahead, the logistics of preparing excellent overview articles and getting them into print in due time requires timely organization. Therefore, we ask you to submit proposals for review chapters and associated talks by October 1st 2012. The respective deadlines and dates are:

Sept. 15, 2012: Submit your proposals
Nov. 15th, 2012: Decision on review chapters and talks
April 15th, 2013: Extended skeleton papers to be submitted to the board

December 1st, 2012: Registration to conference opens (including posters)
May 15th, 2013: End of early registration (late registration at elevated registration fee will be possible)
July 15th, 2013: Submission of the final article

We encourage different groups to join forces and present combined reviews where the competing schools of thoughts are discussed in context and where common grounds as well as controversies are explored in an unbiased and objective way. We see this as a very important aspect of the scientific value of the conference and the resulting book. We aim for about 30 chapters with about 30 pages each, and invite everybody in the community to propose a chapter and associated talk for Protostars and Planets VI. As done during previous incarnations of Protostars and Planets, each review chapter will be presented by a talk during the conference. The speaker may be the PI of the chapter but it may also be a Co-I to increase the visibility of various members of the teams. The Scientific Advisory Committee (SAC) encourages such a split approach. As guideline for the structure of the conference and book, the SAC and the editors found it useful to compile the following topics/chapters. We note that this list is not binding and further suggestions and proposals are welcome.

Star Formation
- Formation of molecular clouds and global conditions for star formation
- Formation of individual stars and clusters
- Origin of stellar multiplicity
- Collapse and formation of protostellar disks
- Formation of very low-mass stars, brown dwarfs and free-floating planets
- A unified picture from low- to high-mass and ”isolated” to clustered” star formation?

Formation and evolution of protoplanetary disks
- Physical characteristics of disks
- Gas evolution in disks
- Dust evolution in disks
- Protoplanetary disks in cluster environment
- Cosmochemical constraints on disk evolution
- Disk dynamics
- Disk dissipation

Planet formation and planetary systems
- Planetesimal formation
- Terrestrial planet formation
- Giant planet formation - Planet-disk interaction
- Structure and evolution of debris disks
- Long term dynamical evolution of planetary systems
- Chemical evolution of planetary systems
- Planetary system architecture
- The solar system in context of planet formation
- Dating of major events in the solar system by isotope studies
- Planetary internal structures
- Planetary atmospheres
- Population synthesis

Astrophysical conditions for life
- Habitability
- Geochemical landscape for the formation of life
- Formation of life

Scientific Advisory Committee (SAC): Philippe Andre, Javier Ballesteros-Paredes, Isabelle Baraffe, Alan Boss, John Bradley, Nuria Calvet, Gael Chauvin, Therese Encrenaz, Guido Garay, Tristan Guillot, Nader Haghighipour, Shigeru Ida, Ray Jayawardhana, Willy Kley, Alexander Krot, Katharina Lodders, Karl Menten, Michael Meyer, Alessandro Morbidelli, Ralph Pudritz, Bo Reipurth, Dimitar Sasselov, Motohide Tamura, Ewine van Dishoeck, Stephane Udry, Alycia Weinberger

Looking forward to exciting proposals!
Henrik Beuther, Ralf Klessen, Kees Dullemond, Thomas Henning

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

Contact: `info@ppvi.org`

2012 Sagan Summer Workshop: Working with Exoplanet Light Curves

C. Brinkworth
NASA Exoplanet Science Institute, California Institute of Technology, Pasadena, CA, USA

Pasadena, CA, July 23-27, 2012

Registration is now open for the 2012 Sagan Exoplanet Summer Workshop on "Working with Exoplanet Light Curves". The workshop will take place on the Caltech campus July 23 - 27, 2012. The workshop is intended for graduate students and postdocs interested in learning more about working with light curves, however, all interested parties are welcome to attend.

This workshop will explore the use of exoplanet light curves to study planetary system architectures and atmospheres and to discover exomoons and ring systems. Attendees will participate in hands-on exercises to gain experience in working with Kepler and other transit light curves, and will also have the opportunity to present their own work through short presentations (research POPs) and electronic posters. Note that there are limited slots for presentation of research POPs in the agenda and these will be filled on a first-come, first-served basis once the submission site opens on April 2. The preliminary agenda can be found on the workshop website and the list of topics to be covered includes:

- The Promise of Transits
- Basic Light Curve Models
- Validation and Confirmation of Transit Signals
- Characterization of Exoplanet Atmospheres
- Planetary Architecture
- Available Analysis Packages
- Working with Kepler Data
- Introduction to Transit Spectroscopy

Important Dates

- June 15: Early on-line registration ends

- June 21: Hotel Registration deadline to be eligible for group rate
- June 29: POP/Poster Submission deadline
- July 13: On-line registration closed
- July 13: Talk Submission by workshop speakers deadline and final agenda posted
- July 22: Sagan Exoplanet Summer Workshop Opening Reception
- July 23-27: 2012 Sagan Exoplanet Summer Workshop

Download/Website: `http://nexsci.caltech.edu/workshop/2012`
Contact: `sagan_workshop@ipac.caltech.edu`

5 Announcements

The Kepler Community Follow-up Observing Program (CFOP)

Kaspar von Braun
NASA Exoplanet Science Institute, California Institute of Technology, Pasadena, CA 91125

NASA Exoplanet Science Institute, Announcement

The Kepler Community Follow-up Observing Program (CFOP) is a web-based tool with the principal aim to optimize resources and facilitate collaboration in follow-up studies of planet candidates in the Kepler field. CFOP currently contains information from the Kepler Input Catalog (KIC), publicly available parameters on the Kepler planetary candidates, target finder charts and information on multiplicity, and links to analysis tools such as ephemeris calculations and periodograms at the NASA Exoplanet Archive, to help plan and execute follow-up studies. In addition, CFOP serves as a repository for community-gathered follow-up data by allowing upload and display of data and derived astrophysical parameters and in the future will contain follow-up data from the Kepler team. All data will be clearly associated with the user who provided it and contact information is available to facilitate additional discussion and begin collaborations. CFOP is available at http://cfop.ipac.caltech.edu/.

Download/Website: `http://cfop.ipac.caltech.edu/`
Contact: `cfop@ipac.caltech.edu`

6 As seen on astro-ph

The following list contains all the entries relating to exoplanets that we spotted on astro-ph during April 2012. If you see any that we missed, please let us know and we'll include them in the next issue.

astro-ph/1204.6283: **ROPS: A New Search for Habitable Earths in the Southern Sky** by *J.R. Barnes, J.S. Jenkins, H.R.A. Jones et al*

astro-ph/1204.6063: **The search for habitable worlds: 1. The viability of a starshade mission** by *Margaret C. Turnbull, Tiffany Glassman, Aki Roberge et al*

astro-ph/1204.5722: **Submillimeter Array Observations of the RX J1633.9-2442 Transition Disk: Evidence for Multiple Planets in the Making** by *Lucas A. Cieza, Geoffrey S. Mathews, Jonathan P. Williams et al*

astro-ph/1204.5696: **Photoionization models of the Eskimo nebula: evidence for a binary central star?** by *Ashkbiz Danehkar, David J. Frew, Quentin A. Parker et al*

astro-ph/1204.5364: **Mid-IR imaging of the transitional disk of HD169142: Measuring the size of the gap** by *M. Honda, Koen Maaskant, Y. K. Okamoto et al*

astro-ph/1204.5302: **In-situ Accretion of Hydrogen-Rich Atmospheres on Short-Period Super-Earths: Implications for the Kepler-11 Planets** by *Masahiro Ikoma, Yasunori Hori*

astro-ph/1204.5187: **Interactions Between Moderate- and Long-Period Giant Planets: Scattering Experiments for Systems in Isolation and with Stellar Flybys** by *Aaron C. Boley, Matthew J. Payne, Eric B. Ford*

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