ExoPlanet News
An Electronic Newsletter

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Contents

1 Editorial

Welcome back after our summer break to the fifty second edition of ExoPlanet News. As usual, this month's newsletter contains a wide selection of abstracts reporting the latest discoveries in the field of exoplanet science.
The next edition of the newsletter is planned for the end of September or beginning of October 2012. 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

PynPoint: An Image Processing Package for Finding Exoplanets

Adam Amara & Sascha P. Quanz
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MNRAS, accepted for publication

We present the scientific performance results of PynPoint, our Python-based software package that uses principle component analysis to detect and estimate the flux of exoplanets in two dimensional imaging data. Recent advances in adaptive optics and imaging technology at visible and infrared wavelengths have opened the door to direct detections of planetary companions to nearby stars, but image processing techniques have yet to be optimized. We show that the performance of our approach gives a marked improvement over what is presently possible using existing methods such as LOCI. To test our approach, we use real angular differential imaging (ADI) data taken with the adaptive optics assisted high resolution near-infrared camera NACO at the VLT. These data were taken during the commissioning of the apodising phase plate (APP) coronagraph. By inserting simulated planets into these data, we test the performance of our method as a function of planet brightness for different positions on the image. We find that in all cases PynPoint has a detection threshold that is superior to that given by our LOCI analysis when assessed in a common statistical framework. We obtain our best improvements for smaller inner working angles (IWA). For an IWA of $\sim$0.29" we find that we achieve a detection sensitivity that is a factor of 5 better than LOCI. We also investigate our ability to correctly measure the flux of planets. Again, we find improvements over LOCI, with PynPoint giving more stable results. Finally, we apply our package to a non-APP dataset of the exoplanet beta Pictoris b and reveal the planet with high signal-to-noise. This confirms that PynPoint can potentially be applied with high fidelity to a wide range of high-contrast imaging datasets.

Download/Website: `http://arxiv.org/abs/1207.6637`

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Can grain growth explain transition disks?

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Astronomy & Astrophysics, in press (arXiv: 1206.5802)

Aims: Grain growth has been suggested as one possible explanation for the diminished dust optical depths in the inner regions of protoplanetary “transition” disks. In this work, we directly test this hypothesis in the context of current models of grain growth and transport.
Methods: A set of dust evolution models with different disk shapes, masses, turbulence parameters, and drift efficiencies is combined with radiative transfer calculations in order to derive theoretical spectral energy distributions (SEDs) and images.
Results: We find that grain growth and transport effects can indeed produce dips in the infrared SED, as typically found in observations of transition disks. Our models achieve the necessary reduction of mass in small dust by producing larger grains, yet not large enough to be fragmenting efficiently. However, this population of large grains is still detectable at millimeter wavelengths. Even if perfect sticking is assumed and radial drift is neglected, a large population of dust grains is left behind because the time scales on which they are swept up by the larger grains are too long. This mechanism thus fails to reproduce the large emission cavities observed in recent millimeter-wave interferometric images of accreting transition disks.

Download/Website: `http://adsabs.harvard.edu/abs/2012arXiv1206.5802B`

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Supernova-Triggered Molecular Cloud Core Collapse and the Rayleigh-Taylor Fingers that Polluted the Solar Nebula

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Astrophysical Journal Letters, in press

A supernova is a likely source of short-lived radioisotopes (SLRIs) that were present during the formation of the earliest solar system solids. A suitably thin and dense supernova shock wave may be capable of triggering the self-gravitational collapse of a molecular cloud core while simultaneously injecting SLRIs. Axisymmetric hydrodynamics models have shown that this injection occurs through a number of Rayleigh-Taylor (RT) rings. Here we use the FLASH adaptive mesh refinement (AMR) hydrodynamics code to calculate the first fully three dimensional (3D) models of the triggering and injection process. The axisymmetric RT rings become RT fingers in 3D. While ~ 100 RT fingers appear early in the 3D models, only a few RT fingers are likely to impact the densest portion of the collapsing cloud core. These few RT fingers must then be the source of any SLRI spatial heterogeneity in the solar nebula inferred from isotopic analyses of chondritic meteorites. The models show that SLRI injection efficiencies from a supernova several pc away fall at the lower end of the range estimated for matching SLRI abundances, perhaps putting them more into agreement with recent reassessments of the level of ^{60}Fe present in the solar nebula.

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

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The habitability and detection of Earth-like planets orbiting cool white dwarfs

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Astrophysical Journal Letters, accepted for publication (arXiv:1207.6210)

Since there are several ways planets can survive the giant phase of the host star, we examine the habitability and detection of planets orbiting white dwarfs. As a white dwarf cools from 6000 K to 4000 K, a planet orbiting at 0.01 AU would remain in the Continuous Habitable Zone (CHZ) for $\sim$ 8 Gyr. We show that photosynthetic processes can be sustained on such planets. The DNA-weighted UV radiation dose for an Earth-like planet in the CHZ is less than the maxima encountered on Earth, hence non-magnetic white dwarfs are compatible with the persistence of complex life. Polarisation due to a terrestrial planet in the CHZ of a cool white dwarf is 10^2 (10^4) times larger than it would be in the habitable zone of a typical M-dwarf (Sun-like star). Polarimetry is thus a viable way to detect close-in rocky planets around white dwarfs. Multi-band polarimetry would also allow reveal the presence of a planet atmosphere, providing a first characterisation. Planets in the CHZ of a 0.6 $M_\odot$ white dwarf will be distorted by Roche geometry, and a Kepler-11d analogue would overfill its Roche lobe. With current facilities a Super-Earth-sized atmosphereless planet is detectable with polarimetry around the brightest known cool white dwarf. Planned future facilities render smaller planets detectable, in particular by increasing the instrumental sensitivity in the blue.

Download/Website: `http://arxiv.org/abs/1207.6210`

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Can planetary instability explain the Kepler dichotomy?

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The Astrophysical Journal, in press (arXiv:1206.6898)

The planet candidates discovered by the *Kepler* mission provide a rich sample to constrain the architectures and relative inclinations of planetary systems within approximately 0.5 AU of their host stars. We use the triple-transit systems from the *Kepler* 16-months data as templates for physical triple-planet systems and perform synthetic transit observations, varying the internal inclination variation of the orbits. We find that all the *Kepler* triple-transit and double-transit systems can be produced from the triple-planet templates, given a low mutual inclination of around five degrees. Our analysis shows that the *Kepler* data contains a population of planets larger than four Earth radii in single-transit systems that can not arise from the triple-planet templates. We explore the hypothesis that high-mass counterparts of the triple-transit systems underwent dynamical instability to produce a population of massive double-planet systems of moderately high mutual inclination. We perform N-body simulations of mass-boosted triple-planet systems and observe how the systems heat up and lose planets by planet-planet collisions, and less frequently by ejections or collisions with the star, yielding transits in agreement with the large planets in the *Kepler* single-transit systems. The resulting population of massive double-planet systems can nevertheless not explain the additional excess of low-mass planets among the observed single-transit systems and the lack of gas-giant planets in double-transit and triple-transit systems. Planetary instability of systems of triple gas-giant planets can be behind part of the dichotomy between systems hosting one or more small planets and those hosting a single giant planet. The main part of the dichotomy, however, is more likely to have arisen already during planet formation when the formation, migration or scattering of a massive planet, triggered above a threshold metallicity, suppressed the formation of other planets in sub-AU orbits.

Download/Website: `http://arxiv.org/abs/1206.6898`

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On the Detectability of Star-Planet Interaction

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Astrophysical Journal, published (2012ApJ...754..137M)

Magnetic (or tidal) interactions between "hot Jupiters" and their host stars can potentially enhance chromospheric and coronal activity. An ideal testbed for investigating this effect is provided by the extreme WASP-18 system, which features a massive ($\sim$10 times Jupiter) close-in (0.94 day period) transiting planet orbiting a young F6 star. Optical and X-ray observations of WASP-18 were conducted in November 2011. The high-resolution echelle spectrograph MIKE was used on the 6.5m Magellan Clay telescope to obtain 13 spectra spanning planetary orbital phases of 0.7–1.4, while the X-ray Telescope on *Swift* provided contemporaneous monitoring with a stacked exposure of $\sim$50 ks. The cores of the Ca II H and K lines do not show significant variability over multiple orbits spanning $\sim$8 d, in contrast to the expectation of phase-dependent chromospheric activity enhancements for efficient star-planet interaction. The star is also X-ray faint, with $\log L_{\rm X} < 27.6$, indicating that coronal activity is likewise low. The lack of detectable star-planet interaction in this extreme system requires that any such effect must here be transient, if indeed present. We demonstrate that searches for Ca II H and K variability can potentially mistake a stellar hotspot, if observed over a short segment of the rotation period, for planet-induced activity. Taken together, these results suggest that the utility of star-planet interaction as a robust method of estimating exoplanet magnetic field strengths may be limited.

Download/Website: `http://arxiv.org/abs/1206.0746`

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The physics of protoplanetesimal dust agglomerates. VII. The low-velocity collision behavior of large dust agglomerates

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Astrophysical Journal, accepted (arXiv: 1208.3095)

[ ] refereed journal We performed micro-gravity collision experiments in our laboratory drop-tower using 5-cm-sized dust agglomerates with volume filling factors of 0.3 and 0.4, respectively. This work is an extension of our previous experiments reported in Beitz et al. (2011) to aggregates of more than one order of magnitude higher masses. The dust aggregates consisted of micrometer-sized silica particles and were macroscopically homogeneous. We measured the coefficient of restitution for collision velocities ranging from $1 \mathrm{~cm~s^{-1}}$ to $0.5 \mathrm{~m~s^{-1}}$, and determined the fragmentation velocity. For low velocities, the coefficient of restitution decreases with increasing impact velocity, in contrast to findings by Beitz et al. (2011). At higher velocities, the value of the coefficient of restitution becomes constant, before the aggregates break at the onset of fragmentation. We interpret the qualitative change in the coefficient of restitution as the transition from a solid-body-dominated to a granular-medium-dominated behavior. We complement our experiments by molecular dynamics simulations of porous aggregates and obtain a reasonable match to the experimental data. We discuss the importance of our experiments for protoplanetary disks, debris disks, and planetary rings. The work is an extensional study to previous work of our group and gives a new insight in the velocity dependency of the coefficient of restitution due to improved measurements, better statistics and a theoretical approach.

Download/Website: `http://arxiv.org/abs/1208.3095`

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Thermal emission from WASP-24b at 3.6 and 4.5 μm

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Astronomy & Astrophysics, in press (arXiv:1203.6017)

We observe occultations of WASP-24b to measure brightness temperatures and to determine whether or not its atmosphere exhibits a thermal inversion (stratosphere). We observed occultations of WASP-24b at 3.6 and 4.5 μm using the Spitzer Space Telescope. It has been suggested that there is a correlation between stellar activity and the presence of inversions, so we analysed existing HARPS spectra in order to calculate $\log R'_{\rm HK}$ for WASP-24 and thus determine whether or not the star is chromospherically active. We also observed a transit of WASP-24b in the Strömgren u and y bands, with the CAHA 2.2-m telescope. We measure occultation depths of 0.159 ± 0.013 per cent at 3.6 μm and 0.202 ± 0.018 per cent at 4.5 μm. The corresponding planetary brightness temperatures are 1974 ± 71 K and 1944 ± 85 K respectively. Atmosphere models with and without a thermal inversion fit the data equally well; we are unable to constrain the presence of an inversion without additional occultation measurements in the near-IR. We find $\log R'_{\rm HK} = -4.98 \pm 0.12$, indicating that WASP-24 is not a chromospherically active star. Our global analysis of new and previously-published data has refined the system parameters, and we find no evidence that the orbit of WASP-24b is non-circular. These results emphasise the importance of complementing *Spitzer* measurements with observations at shorter wavelengths to gain a full understanding of hot Jupiter atmospheres.

Download/Website: `http://arxiv.org/abs/1203.6017`

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z'-band ground-based detection of the secondary eclipse of WASP-19b

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ApJS, published (2012ApJS..201...36B)

We present the ground-based detection of the secondary eclipse of the transiting exoplanet WASP-19b. The observations were made in the Sloan z'-band using the ULTRACAM triple-beam CCD camera mounted on the NTT. The measurement shows a 0.088±0.019% eclipse depth, matching previous predictions based on H- and K-band measurements. We discuss in detail our approach to the removal of errors arising due to systematics in the data set, in addition to fitting a model transit to our data. This fit returns an eclipse centre, T_0, of 2455578.7676 HJD, consistent with a circular orbit. Our measurement of the secondary eclipse depth is also compared to model atmospheres of WASP-19b, and is found to be consistent with previous measurements at longer wavelengths for the model atmospheres we investigated.

Download/Website: `http://iopscience.iop.org/0067-0049/201/2/36/`

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Ground-based search for the brightest transiting planets with the Multi-site All-Sky CAmeRA - MASCARA

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SPIE, Astronomical Telescopes and Instrumentation 2012

The Multi-site All-sky CAmeRA MASCARA is an instrument concept consisting of several stations across the globe, with each station containing a battery of low-cost cameras to monitor the near-entire sky at each location. Once all stations have been installed, MASCARA will be able to provide a nearly 24-hr coverage of the complete dark sky, down to magnitude 8, at sub-minute cadence. Its purpose is to find the brightest transiting exoplanet systems, expected in the V=4-8 magnitude range - currently not probed by space- or ground-based surveys. The bright/nearby transiting planet systems, which MASCARA will discover, will be the key targets for detailed planet atmosphere observations. We present studies on the initial design of a MASCARA station, including the camera housing, domes, and computer equipment, and on the photometric stability of low-cost cameras showing that a precision of 0.3-1% per hour can be readily achieved. We plan to roll out the first MASCARA station before the end of 2013. A 5-station MASCARA can within two years discover up to a dozen of the brightest transiting planet systems in the sky.

Download/Website: `http://xxx.lanl.gov/abs/1208.4116; http://mascara.strw.leidenuniv.nl`

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An Empirical Correction for Activity Effects on the Temperatures, Radii, and Estimated Masses of Low-Mass Stars and Brown Dwarfs

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Astrophysical Journal, in press (arxiv:1206.4930)

We present empirical relations for determining the amount by which the effective temperatures and radii—and therefore the estimated masses—of low-mass stars and brown dwarfs are altered due to chromospheric activity. We base our relations on a large set of low-mass stars in the field with Halpha activity measurements, and on a set of low-mass eclipsing binaries with X-ray activity measurements from which we indirectly infer the Hα activity. Both samples yield consistent relations linking the amount by which an active object's temperature is suppressed, and its radius inflated, to the strength of its Halpha emission. These relations are found to approximately preserve bolometric luminosity. We apply these relations to the peculiar brown-dwarf eclipsing binary 2M0535$-$05, in which the active, higher-mass brown dwarf has a cooler temperature than its inactive, lower-mass companion. The relations correctly reproduce the observed temperatures and radii of 2M0535$-$05 after accounting for the Hα emission; 2M0535$-$05 would be in precise agreement with theoretical isochrones were it inactive. The relations that we present are applicable to brown dwarfs and low-mass stars with masses below 0.8 $M_\odot$ and for which the activity, as measured by the fractional Hα luminosity, is in the range $-4.6 < \log L_{H\alpha}/L_{\rm bol} < -3.3$. We expect these relations to be most useful for correcting radius and mass estimates of low-mass stars and brown dwarfs over their active lifetimes (few Gyr) and when the ages or distances (and therefore luminosities) are unknown. Accurate estimates of stellar radii are especially important in the context of searches for transiting exoplanets, which rely upon the

assumed stellar radius/density to infer the planet radius/density. We also discuss the implications of this work for improved determinations of young cluster initial mass functions.

Download/Website: `http://arxiv.org/abs/1206.4930`

Contact: `keivan.stassun@vanderbilt.edu`

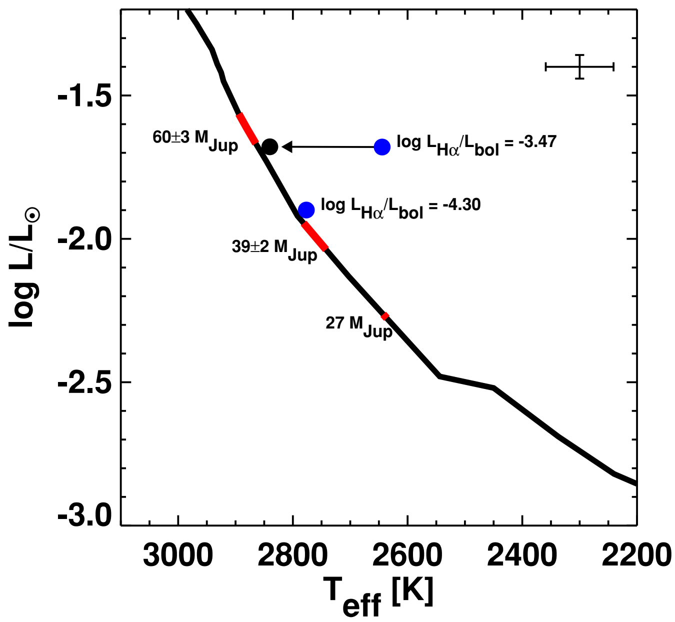

Figure 1: (Stassun et al.) Hertzsprung-Russell diagram for the primary and secondary components of the brown-dwarf eclipsing binary 2M0535−05 in the ∼1-Myr Orion Nebula Cluster. The measured $T_{\rm eff}$ and $L_{\rm bol}$ (the latter calculated from the directly measured $T_{\rm eff}$ and radii) for both brown dwarfs are represented as blue symbols. Measurement uncertainties in $T_{\rm eff}$ and $L_{\rm bol}$ are represented by the error bars at upper right. The dynamically measured masses of the primary and secondary are 60±3 and 39±2 $M_{\rm Jup}$, respectively, represented as red bars on the 1-Myr theoretical isochrone of Baraffe et al. (1998). The measured $L_{H\alpha}/L_{\rm bol}$ for the two components from Reiners et al. (2007) are indicated next to the blue symbols. The inactive secondary appears close to its expected position on the isochrone, whereas the active primary appears far cooler than expected. The primary therefore appears to be much younger than the secondary and to have a mass of only ≈27 $M_{\rm Jup}$ based on its observed $T_{\rm eff}$, a factor of 2 lower than its true mass. Shifting the position of the active primary (arrow) using our empirically calibrated Hα-based relations for $T_{\rm eff}$ suppression and radius inflation brings the primary into much closer agreement with its theoretically expected position in the HR diagram (black symbol); this is where the active primary would be if it were not active.

Breaking through: The effects of a velocity distribution on barriers to dust growth

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Astronomy & Astrophysics Letters, 544, L16 (2012)

It is unknown how far dust growth can proceed by coagulation. Obstacles to collisional growth are the fragmentation and bouncing barriers. However, in all previous simulations of the dust-size evolution, only the mean collision velocity has been considered, neglecting that a small but possibly important fraction of the collisions will occur at both much lower and higher velocities. We study the effect of the probability distribution of impact velocities on the collisional dust growth barriers. Assuming a Maxwellian velocity distribution for colliding particles to determine the fraction of sticking, bouncing, and fragmentation, we implement this in a dust-size evolution code. We also calculate the probability of growing through the barriers and the growth timescale in these regimes. We find that the collisional growth barriers are not as sharp as previously thought. With the existence of low-velocity collisions, a small fraction of the particles manage to grow to masses orders of magnitude above the main population. A particle velocity distribution softens the fragmentation barrier and removes the bouncing barrier. It broadens the size distribution in a natural way, allowing the largest particles to become the first seeds that initiate sweep-up growth towards planetesimal sizes.

Download/Website: `http://adsabs.harvard.edu/abs/2012A%26A...544L..16W`

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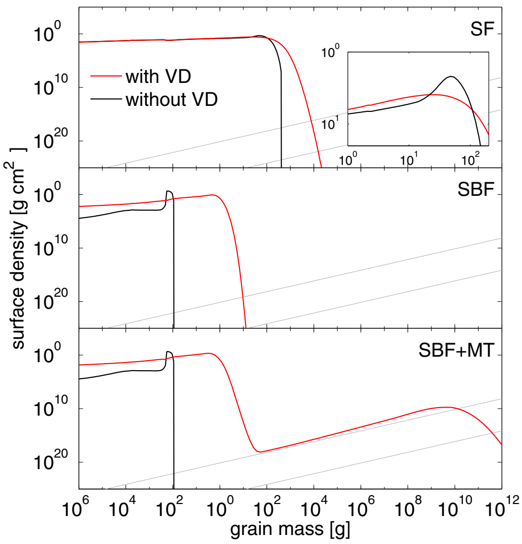

Figure 2: (Windmark et al.) Snapshot of the size-distributions for SF (upper), SBF (middle), and SBF+MT (lower) collision models taken after $t = 5 \cdot 10^4$ years, with (red) and without (black) a velocity distribution. The gray diagonal lines correspond to a total of 1 and 10^6 particles within a 0.1 AU annulus, respectively.

A 1D microphysical cloud model for Earth, and Earth-like exoplanets, Liquid water and water ice clouds in the convective troposphere

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Icarus, accepted for publication (2012arXiv1208.5028Z)

One significant difference between the atmospheres of stars and exoplanets is the presence of condensed particles (clouds or hazes) in the atmosphere of the latter. In current 1D models clouds and hazes are treated in an approximate way by raising the surface albedo, or adopting measured Earth cloud properties. The former method introduces errors to the modeled spectra of the exoplanet, as clouds shield the lower atmosphere and thus modify the spectral features. The latter method works only for an exact Earth-analog, but it is challenging to extend to other planets.
The main goal of this paper is to develop a self-consistent microphysical cloud model for 1D atmospheric codes, which can reproduce some observed properties of Earth, such as the average albedo, surface temperature, and global energy budget. The cloud model is designed to be computationally efficient, simple to implement, and applicable for a wide range of atmospheric parameters for planets in the habitable zone.
We use a 1D, cloud-free, radiative-convective, and photochemical equilibrium code originally developed by Kasting, Pavlov, Segura, and collaborators as basis for our cloudy atmosphere model. The cloud model is based on models used by the meteorology community for Earth's clouds. The free parameters of the model are the relative humidity and number density of condensation nuclei, and the precipitation efficiency. In a 1D model, the cloud coverage cannot be self-consistently determined, thus we treat it as a free parameter.
We apply this model to Earth (aerosol number density 100 cm^{-3}, relative humidity 77 %, liquid cloud fraction 40%, and ice cloud fraction 25%) and find that a precipitation efficiency of 0.8 is needed to reproduce the albedo, average surface temperature and global energy budget of Earth. We perform simulations to determine how the albedo and the climate of a planet is influenced by the free parameters of the cloud model. We find that the planetary climate is most sensitive to changes in the liquid water cloud fraction and precipitation efficiency.
The advantage of our cloud model is that the cloud height and the droplet sizes are self-consistently calculated, both of which influence the climate and albedo of exoplanets.

Download/Website: `http://arxiv.org/abs/1208.5028`

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3 Jobs and Positions

ExoMol project: Postdoctoral Research Associate

Jonathan Tennyson
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UCL, Post available to start any time up to 1 May 2013 and is funded for 2 years in the first instance.

Applications are invited for a post-doctoral position to work with Prof Jonathan Tennyson and Dr Sergei Yurchenko as part of the ExoMol (www.exomol.com) project aimed at calculating extensive line lists as input for spectroscopic models of the atmospheres of extrasolar planets (and other hot bodies). The opening is to develop methods to compute line lists for larger systems such as small hydrocarbons and nitric acid.
Informal enquiries can be made to Prof Jonathan Tennyson (j.tennyson@ucl.ac.uk) Telephone: (+44) 20 7679 7809.
Closing date for applications: 15 October 2012
Further particulars and application procedure can be found via:

Download/Website: `http://www.exomol.com/vacancies.html`

Contact: `j.tennyson@ucl.ac.uk`

2012 NASA Sagan Fellowship Program

Dr. Dawn M. Gelino
NASA Exoplanet Science Institute

Applications Due: Nov. 1, 2012, Start Date: Fall 2013

The NASA Exoplanet Science Institute announces the 2013 Sagan Postdoctoral Fellowship Program and solicits applications for fellowships to begin in the Fall of 2013.
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, 2010, 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 1, 2012. Offers will be made before February 1, 2013 and new appointments are expected to begin on or about September 1, 2013.

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

Contact: `saganfellowship@ipac.caltech.edu`

4 Conference announcements

IAU Symposium 299: Exploring the Formation and Evolution of Planetary Systems

Brenda Matthews
Dunlap Institute for Astronomy & Astrophysics and the National Research Council of Canada

Victoria, BC, Canada, 2-7 June 2013

This is the first announcement for the 299th Symposium of the International Astronomical Union (IAU), "Exploring the Formation and Evolution of Planetary Systems", co-organized by the Dunlap Institute for Astronomy & Astrophysics and the National Research Council of Canada. The goal of this meeting is to bring together the communities studying the formation of planets in protoplanetary discs and those who study evolved exoplanet systems. The timing is chosen to highlight the first results from a number of new facilities and instruments which will impact these fields. Topics will include:

- Observations of protoplanetary discs, debris discs and exoplanets
- Planetesimal and planet formation
- Exoplanet atmospheres and interior structure
- Dynamics in planetary systems: migration, multiplicity and planet-disc interactions

The meeting will be held at the Victoria Conference Centre in the heart of picturesque Victoria, British Columbia, on Canada's Pacific coast. Local attractions include whale watching, wine tours, the world-famous Butchart Gardens, and the Dominion Astrophysical Observatory. Excellent beaches, diving, camping and hiking are all within a day's drive from Victoria.

Pre-Registration

Registration will open on 1 September 2012, but those interested in attending the meeting are welcome to submit their names to our pre-registration list. Pre-registrants will be sent the invitation to register for the meeting directly, but places are not reserved once registration is officially opened. There will be a hard limit of 200 attendees for the symposium. To pre-register and be placed on the mailing list, just send an email indicating your interest to the conference email: iaus-299@di.utoronto.ca.

Financial Assistance

In keeping with the spirit of the IAU Symposia, the costs of the meeting will be kept as low as possible. In addition, financial assistance in the form of IAU Support Grants is available for those needing financial assistance to attend. All student attendees who register in the Early Registration period (1 Sept - 7 Dec 2012) will receive financial support. The deadline for submission of grant applications to the Science Organizing Committee is 7 December 2012; forms and directions are available on the symposium website.

Key Dates

1 Sept 2012:	Early Registration Opens
7 Dec 2012:	Deadline for Early Registration and Applications for IAU Support Grants
31 March 2013:	Deadline for Registration and Abstract Submission
2 June 2013:	Evening Reception/Symposium Begins
3-7 June 2013:	Symposium

For more information, please visit our website, facebook event entry or email the conference. We hope to see you in Victoria in June 2013!

Brenda Matthews.
LOC Chair, on behalf of the LOC and SOC

Download/Website: `http://www.iaus299.org, https://www.facebook.com/events/376085279113847/`

Contact: `iaus-299@di.utoronto.ca`

5 Announcements

2013A NASA Keck Call for Proposals

Dr. Dawn M. Gelino
NASA Exoplanet Science Institute

Proposals Due: Sept. 13, 2012, 4 pm PDT

NASA is soliciting proposals to use the two 10m W. M. Keck Telescopes for the 2013A observing semester (February - July 2013). The opportunity to propose as Principal Investigators for the NASA time on the Keck Telescopes is open to all U.S.-based astronomers (U.S.-based astronomers have their principal affiliation at a U.S. institution). Investigators from institutions outside of the U.S. may be on proposals as Co-Investigators only.

NASA intends the use of the Keck telescopes to be highly strategic in support of on-going space missions and/or high priority, long term science goals. NASA Keck time is open to a wide range of disciplines including exoplanets and solar system topics, galactic, and extragalactic topics, cosmology and high energy astrophysics.

This semester and continuing into future semesters, there is limited time available for observations of targets based on public Kepler data or data obtained through the Kepler Guest Observer programs.

Proposals are also sought in the following discipline areas: (1) investigations in support of EXOPLANET EXPLORATION science goals and missions; (2) investigations of our own SOLAR SYSTEM; (3) investigations in support of COSMIC ORIGINS science goals and missions; (4) investigations in support of PHYSICS OF THE COSMOS science goals and missions; and (5) direct MISSION SUPPORT.

The proposal process is being handled by the NASA Exoplanet Science Institute (NExScI) at Caltech and all proposals are due on 13 September 2012 at 4 pm PDT.

Download/Website: `http://nexsci.caltech.edu/missions/KeckSolicitation/index.shtml`

Contact: `KeckCFP@ipac.caltech.edu`

Habitable Zone Gallery upgrade

Stephen R. Kane & Dawn M. Gelino
NASA Exoplanet Science Institute, Caltech, MS 100-22, 770 South Wilson Avenue, Pasadena, CA 91125, USA

The Habitable Zone Gallery (www.hzgallery.org) is a service to the exoplanet community which provides Habitable Zone information for each of the exoplanetary systems with known planetary orbital parameters. To coincide with the one year anniversary of the service release, we announce various upgrades to the service which includes new summary plots and table download features. The front page now includes Habitable Zone information represented in a mass vs period plot in addition to the existing eccentricity vs period version. An animated version of this plot is available which shows the evolution of this discovery space as a function of time. We have also added a CSV table download feature which allows users to download the complete table of Habitable Zones and predicted temperatures for all planets. We welcome feedback and suggestions.

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

Contact: `skane@ipac.caltech.edu,dawn@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 July and August 2012. If you see any that we missed, please let us know and we'll include them in the next issue.

July:

astro-ph/1207.0038: **A Detailed Investigation of the Proposed NN Serpentis Planetary System** by *Jonathan Horner et al.*

astro-ph/1207.0101: **Kepler-16b: a resonant survivor** by *E. A. Popova, I. I. Shevchenko*

astro-ph/1207.0260 : **Grain growth signatures in the protoplanetary discs of Chamaeleon and Lupus** by *Catarina Ubach et al.*

astro-ph/1207.0488: **Planets Around the K-Giants BD+20 274 and HD 219415** by *S. Gettel et al.*

astro-ph/1207.0521: **Confusion limited surveys: using WISE to quantify the rarity of warm dust around Kepler stars** by *G. M. Kennedy, M. C. Wyatt*

astro-ph/1207.0690: **Evolutionary Tracks of Trapped, Accreting Protoplanets: the Origin of the Observed Mass-Period Relation** by *Yasuhiro Hasegawa, Ralph E. Pudritz*

astro-ph/1207.0722: **Chemical Timescales in the Atmospheres of Highly Eccentric Exoplanets** by *Channon Visscher*

astro-ph/1207.0754: **A Lagrangian Integrator for Planetary Accretion and Dynamics (LIPAD)** by *Harold F. Levison, Martin J. Duncan, Edward Thommes*

astro-ph/1207.0818: **Two 'b's in the Beehive: The Discovery of the First Hot Jupiters in an Open Cluster** by *S. N. Quinn et al.*

astro-ph/1207.1012: **A Hot Uranus Orbiting the Super Metal-rich Star HD77338 and the Metallicity - Mass Connection** by *James S. Jenkins et al.*

astro-ph/1207.1162 : **Rapid disappearance of a warm, dusty circumstellar disk** by *Carl Melis et al.*

astro-ph/1207.1220 (cross-list from astro-ph.GA): **Interferometric Identification of a Pre-Brown Dwarf** by *Philippe André, Derek Ward-Thompson, Jane Greaves*

astro-ph/1207.1234: **Crossing barriers in planetesimal formation: The growth of mm-dust aggregates with large constituent grains** by *Tim Jankowski et al.*

astro-ph/1207.1244: **A possible binary system of a stellar remnant in the high magnification gravitational microlensing event OGLE-2007-BLG-514** by *N. Miyake et al.*

astro-ph/1207.1449 : **Substellar Objects in Nearby Young Clusters (SONYC) VI: The planetary-mass domain of NGC1333** by *Alexander Scholz et al.*

astro-ph/1207.1715: **SOPHIE velocimetry of Kepler transit candidates VI. An additional companion in the KOI-13 system** by *A. Santerne et al.*

astro-ph/1207.1907: **Dust cloud lightning in extraterrestrial atmospheres** by *Christiane Helling et al.*

astro-ph/1207.1987: **An insight in the surroundings of HR4796** by *A.-M. Lagrange et al.*

astro-ph/1207.2002: **Forming Different Planetary Systems** by *J.-L. Zhou et al.*

astro-ph/1207.2127: **Effect of the stellar spin history on the tidal evolution of close-in planets** by *Emeline Bolmont et al.*

astro-ph/1207.2388: **Chemical abundances of 1111 FGK stars from the HARPS GTO planet search program.Galactic stellar populations and planets** by *V. Zh. Adibekyan et al.*

astro-ph/1207.2481: **Constraining the False Positive Rate for Kepler Planet Candidates with Multi-Color Photometry from the GTC** by *Knicole D. Colón, Eric B. Ford, Robert C. Morehead*

astro-ph/1207.2770: **Jupiter will become a hot Jupiter: Consequences of Post-Main-Sequence Stellar Evolution on Gas Giant Planets** by *David S. Spiegel, Nikku Madhusudhan*

astro-ph/1207.2806: **The Lick-Carnegie Survey: A New Two-Planet System Around the Star HD 207832** by *Nader Haghighipour et al.*

astro-ph/1207.3064: **The Transiting System GJ1214: High-Precision Defocused Transit Observations and a Search for Evidence of Transit Timing Variation** by *K.B.W. Harpsoe et al.*
astro-ph/1207.3101: **Post-Impact Thermal Evolution of Porous Planetesimals** by *T. M. Davison, F. J. Ciesla, G. S. Collins*
astro-ph/1207.3141: **Substellar Companions to Seven Evolved Intermediate-Mass Stars** by *Bun'ei Sato et al.*
astro-ph/1207.3171: **Dissipation in planar resonant planetary systems** by *J.-B. Delisle et al.*
astro-ph/1207.3278: **Ohmic Dissipation in the Interiors of Hot Jupiters** by *Xu Huang, Andrew Cumming*
astro-ph/1207.3344: **HAT-P-39b–HAT-P-41b: Three Highly Inflated Transiting Hot Jupiters** by *J. D. Hartman et al.*
astro-ph/1207.3545: **Planets in Open Clusters Detectable by Kepler** by *Sourav Chatterjee et al.*
astro-ph/1207.3669: **Experiments on centimeter-sized dust aggregates and their implications for planetesimal formation** by *Thorsten Meisner, Jens Teiser, Gerhard Wurm*
astro-ph/1207.4034: **Studying wave optics in exoplanet microlensing light curves** by *Ahmad Mehrabi, Sohrab Rahvar*
astro-ph/1207.4192: **Extracting Planet Mass and Eccentricity From TTV data** by *Yoram Lithwick, Jiwei Xie, Yanqin Wu*
astro-ph/1207.4245: **Two nearby sub-Earth-sized exoplanet candidates in the GJ 436 system** by *Kevin B. Stevenson et al.*
astro-ph/1207.4261: **The effects of viscosity on the circumplanetary disks** by *Defu Bu, Hsien Shang, Feng Yuan*
astro-ph/arXiv:1207.4284: **On the Evolution of the Snow Line in Protoplanetary Discs** by *Rebecca G. Martin, Mario Livio*
astro-ph/1207.4329: **Comparison of different exoplanet mass detection limit methods using a sample of main-sequence intermediate-type stars** by *Nadège Meunier, Anne-Marie Lagrange, Katrien De Bondt*
astro-ph/1207.4427: **VLT imaging of the ? Pictoris gas disk** by *R. Nilsson et al.*
astro-ph/1207.4477: **The effects of viewing angle on the mass distribution of exoplanets** by *S. Lopez, J. S. Jenkins*
astro-ph/1207.4515: **GJ 581 update: Additional Evidence for a Super-Earth in the Habitable Zone** by *Steven S. Vogt, R. Paul Butler, Nader Haghighipour*
astro-ph/1207.4677: **Planetesimal Formation In Self-Gravitating Discs** by *P. G. Gibbons, W. K. M. Rice, G. R. Mamatsashvili*
astro-ph/1207.4755 : **The Impact of Stellar Abundance Variations on Stellar Habitable Zone Evolution** by *Patrick A. Young, Kelley Liebst, Michael Pagano*
astro-ph/1207.5250: **Architecture of Planetary Systems Based on Kepler Data: Number of Planets and Coplanarity** by *Julia Fang, Jean-Luc Margot*
astro-ph/1207.5639: **Doppler Signatures of the Atmospheric Circulation on Hot Jupiters** by *Adam P. Showman et al.*
astro-ph/1207.5796: **Homogeneous studies of transiting extrasolar planets. V. New results for 38 planets** by *John Southworth*
astro-ph/1207.5797: **High-precision photometry by telescope defocussing. IV. Confirmation of the huge radius of WASP-17b** by *John Southworth et al.*
astro-ph/1207.5804: **Alignment of the stellar spin with the orbits of a three-planet system** by *Roberto Sanchis-Ojeda et al.*
astro-ph/1207.5909: **Impact of angular differential imaging on circumstellar disk images** by *J. Milli et al.*
astro-ph/1207.5970: **Tidal evolution of close-in giant planets : Evidence of Type II migration?** by *W. K. M. Rice, J. Veljanoski, A. Collier Cameron*
astro-ph/1207.6017: **Direct imaging of extra-solar planets in star forming regions: Lessons learned from a false positive around IM Lup** by *Dimitri Mawet et al.*
astro-ph/1207.6210 : **The habitability and detection of Earth-like planets orbiting cool white dwarfs** by *L. Fossati et al.*

astro-ph/1207.6276: **Bayesian analysis of exoplanet and binary orbits** by *Tim Schulze-Hartung, Ralf Launhardt, Thomas Henning*
astro-ph/1207.6601: **Limits on orbit crossing planetesimals in the resonant multiple planet system, KOI-730** by *Alexander Moore, Imran Hasan, Alice Quillen*
astro-ph/1207.6637: **PynPoint: An Image Processing Package for Finding Exoplanets** by *Adam Amara, Sascha Quanz*
astro-ph/1207.6895: **Detection of sodium absorption in WASP-17b with Magellan** by *G. Zhou, D. D. R. Bayliss*
astro-ph/1207.6966: **The Rossiter-McLaughlin effect for exomoons or binary planets** by *Quntao Zhuang, Xun Gao, Qingjuan Yu*
astro-ph/1207.7082 : **Inner edges of compact debris disks around metal-rich white dwarfs** by *Roman R. Rafikov, Jose A. Garmilla*
astro-ph/1207.7104: **Migration rates of planets due to scattering of planetesimals** by *Chris Ormel, Shigeru Ida, Hidekazu Tanaka*
astro-ph/1207.7229: **Multiple planets or exomoons in Kepler hot Jupiter systems with transit timing variations?** by *R. Szabó, Gy. M. Szabó, G. Dálya*

August:

astro-ph/1208.0126: **Atmospheric circulation of hot Jupiters: insensitivity to initial conditions** by *Beibei Liu, Adam P. Showman*
astro-ph/1208.0242: **Multiplicity in transiting planet host stars. A Lucky Imaging study of Kepler candidates** by *J. Lillo-Box, D. Barrado, H. Bouy*
astro-ph/1208.0304: **Breaking through: The effects of a velocity distribution on barriers to dust growth** by *Fredrik Windmark et al.*
astro-ph/1208.0377: **The anelastic equilibrium tide in exoplanetary systems** by *F. Remus et al.*
astro-ph/1208.0560: **A chemical model for the atmosphere of hot Jupiters** by *Olivia Venot, et al.*
astro-ph/1208.0595: **The Derivation, Properties and Value of Kepler's Combined Differential Photometric Precision** by *Jessie L. Christiansen, et al.*
astro-ph/1208.0814: **Dynamical evolution and spin-orbit resonances of potentially habitable exoplanets. The case of GJ 581d** by *Valeri V. Makarov, Ciprian Berghea, Michael Efroimsky*
astro-ph/1208.0933: **Coupled evolutions of the stellar obliquity, orbital distance, and planet's radius due to the Ohmic dissipation induced in a diamagnetic hot Jupiter around a magnetic T Tauri star** by *Yu-Ling Chang, Peter H. Bodenheimer, Pin-Gao Gu*
astro-ph/1208.0942: **The Detection and Characterization of a Nontransiting Planet by Transit Timing Variations** by *David Nesvorny et al.*
astro-ph/1208.1157: **Swarm-NG: a CUDA Library for Parallel n-body Integrations with focus on Simulations of Planetary Systems** by *Saleh Dindar et al.*
astro-ph/1208.1432: **The excitation of planetary orbits by stellar jet variability and polarity reversal** by *Fathi Namouni*
astro-ph/1208.1759: **Coplanar Circumbinary Debris Disks** by *G. M. Kennedy et al.*
astro-ph/1208.2051: **Regions of Dynamical Stability for Discs and Planets in Binary Stars of the Solar Neighborhood** by *Luisa G. Jaime, Barbara Pichardo, Luis Aguilar*
astro-ph/1208.2075 : **Polarimetric Imaging of Large Cavity Structures in the Pre-transitional Protoplanetary Disk around PDS 70: Observations of the disk** by *Jun Hashimoto et al.*
astro-ph/1208.2270 : **From Protoplanetary Disks to Extrasolar Planets: Understanding the Life Cycle of Circumstellar Gas with Ultraviolet Spectroscopy** by *Kevin France et al.*
astro-ph/1208.2273: **Precise Doppler Monitoring of Barnard's Star** by *Jieun Choiet al.*
astro-ph/1208.2274: **Three-Dimensional Atmospheric Circulation Models of HD 189733b and HD 209458b with Consistent Magnetic Drag and Ohmic Dissipation** by *E. Rauscher, K. Menou*

astro-ph/1208.2276: **Binary Evolution Leads to Two Populations of White Dwarf Companions** by *David S. Spiegel*
astro-ph/1208.2795: **The influence of forward-scattered light in transmission measurements of (exo)planetary atmospheres** by *R. J. de Kok, D. M. Stam*
astro-ph/1208.2909: **Chemical differentiation of planets: a core issue** by *Herve Toulhoat et al.*
astro-ph/1208.2957: **Statistical Study of the Early Solar System's Instability with 4, 5 and 6 Giant Planets** by *David Nesvorny, Alessandro Morbidelli*
astro-ph/1208.3092 : **Deep search for companions to probable young brown dwarfs** by *G. Chauvin et al.*
astro-ph/1208.3095: **The physics of protoplanetesimal dust agglomerates. VII The low-velocity collision behavior of large dust agglomerates** by *Rainer Schräpler et al.*
astro-ph/1208.3170: **Low-mass planets in nearly inviscid disks: Numerical treatment** by *Wilhelm Kley et al.*
astro-ph/1208.3289: **Planetesimal Compositions in Exoplanet Systems** by *Torrence V. Johnson et al.*
astro-ph/1208.3312: **Transit Timing Variation of Near-Resonant KOI Pairs: Confirmation of 12 Multiple Planet Systems** by *Ji-Wei Xie*
astro-ph/1208.3499: **Transit Timing Observations from Kepler: VII. Confirmation of 27 planets in 13 multiplanet systems via Transit Timing Variations and orbital stability** by *Jason H. Steffen et al.*
astro-ph/1208.3583: **Period ratios in multi-planetary systems discovered by Kepler are consistent with planet migration** by *Hanno Rein*
astro-ph/1208.3591: **A transiting companion to the eclipsing binary KIC002856960** by *D. Armstrong et al.*
astro-ph/1208.3693: **Modelling the light-curve of KIC012557548: an extrasolar planet with a comet like tail** by *Jan Budaj*
astro-ph/1208.3712 : **The Neptune-Sized Circumbinary Planet Kepler-38b** by *Jerome A. Orosz et al.*
astro-ph/1208.3795: **Three-dimensional atmospheric circulation of hot Jupiters on highly eccentric orbits** by *Tiffany Kataria et al.*
astro-ph/1208.3963: **A long-period massive planet around HD106515A** by *S. Desidera et al.*
astro-ph/1208.4000: **Planetary companions around the metal-poor star HIP 11952** by *J. Setiawan et al.*
astro-ph/1208.4115: **Cyclic Transit Probabilities of Long-Period Eccentric Planets Due to Periastron Precession** by *Stephen R. Kane, Jonathan Horner, Kaspar von Braun*
astro-ph/1208.4116: **Ground-based search for the brightest transiting planets with the Multi-site All-Sky CAmeRA - MASCARA** by *Ignas Snellen et al.*
astro-ph/1208.4224 : **Turbulent Linewidths as a Diagnostic of Self-Gravity in Protostellar Discs** by *Duncan H. Forgan, Philip J. Armitage, Jacob B. Simon*
astro-ph/1208.4554: **Identification and Removal of Noise Modes in Kepler Photometry** by *Erik A. Petigura, Geoffrey W. Marcy*
astro-ph/1208.4557: **High Contrast Imaging of the Close Environment of HD 142527** by *J. Rameau et al.*
astro-ph/1208.4687: **Dynamics of pebbles in the vicinity of a growing planetary embryo: hydro-dynamical simulations** by *Alessandro Morbidelli, David Nesvorny*
astro-ph/1208.4694: **Building Terrestrial Planets** by *Alessandro Morbidelli et al.*
astro-ph/1208.4940 : **The EBLM Project I-Physical and orbital parameters, including spin-orbit angles, of two low-mass eclipsing binaries on opposite sides of the Brown Dwarf limit** by *Amaury H.M.J. Triaud et al.*
astro-ph/1208.4947: **Dust-trapping Rossby vortices in protoplanetary disks** by *H. Meheut et al.*
astro-ph/1208.4959 : **FUV and X-ray irradiated protoplanetary disks: a grid of models I. The disk structure** by *R. Meijerink et al.*
astro-ph/1208.4982: **GTC OSIRIS transiting exoplanet atmospheric survey: detection of sodium in XO-2b from differential long-slit spectroscopy** by *D. K. Sing et al.*
astro-ph/1208.5028: **A 1D microphysical cloud model for Earth, and Earth-like exoplanets. Liquid water and water ice clouds in the convective troposphere** by *A. Zsom, L. Kaltenegger, C. Goldblatt*
astro-ph/1208.5436: **Planet gaps in the dust layer of 3D protoplanetary disks. II. Observability with ALMA** by

J.-F. Gonzalez et al.

astro-ph/1208.5489 : **Kepler-47: A Transiting Circumbinary Multi-Planet System** by *Jerome A. Orosz et al.*

astro-ph/1208.5497 : **Locating the Trailing Edge of the Circumbinary Ring in the KH 15D System** by *Holly L. Capelo et al.*

astro-ph/1208.5513: **The growth and hydrodynamic collapse of a protoplanet envelope** by *Ben A. Ayliffe, Matthew R. Bate*

astro-ph/1208.5709: **Revisiting rho 1 Cancri e: A New Mass Determination Of The Transiting super-Earth** by *Michael Endl et al.*

astro-ph/1208.5769: **New Exoplanet Surveys in the Canadian High Arctic at 80 Degrees North** by *Nicholas M. Law et al.*

astro-ph/1208.5937: **The Orbital Stability of Planets Trapped in the First-Order Mean-Motion Resonances** by *Yuji Matsumoto, Makiko Nagasawa, Shigeru Ida*

astro-ph/1208.5943: **Protoplanetary migration in non-isothermal discs with turbulence driven by stochastic forcing** by *A. Pierens, C. Baruteau, F. Hersant*