ExoPlanet News
An Electronic Newsletter

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1 Editorial

Welcome to the thirty-fourth edition of ExoPlanet News. Thanks to all our contributors for sending in another batch of fascinating abstracts, notifications of interesting meetings, and the always well-received job advertisements. Welcome also to our new subscribers – please continue to circulate the newsletter to your colleagues, and encourage others to sign up by dropping us an e-mail. 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.
Please send anything relevant to exoplanet@open.ac.uk, and it will appear in the next edition which we plan to send out at the beginning of December 2010.

Best wishes
Andrew Norton & Glenn White
The Open University

2 Abstracts of refereed papers

WASP-38b: A Transiting Exoplanet in an Eccentric, 6.87d Period Orbit

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A&A, accepted (astro-ph:1010.0849)

We report the discovery of WASP-38b, a long period transiting planet in an eccentric 6.871815 day orbit. The transit epoch is $2455335.92050 \pm 0.00074$ (HJD) and the transit duration is 4.663 hours. WASP-38b's discovery was enabled due to an upgrade to the SuperWASP-North cameras. We performed a spectral analysis of the host star HD 146389/BD+10 2980 that yielded $T_{eff} = 6150 \pm 80\,\mathrm{K}$, $\log g = 4.3 \pm 0.1$, $v \sin i$=8.6 $\pm\, 0.4\, km\, s^{-1}$, $M_* = 1.16 \pm 0.04\,\mathrm{M}_\odot$ and $R_* = 1.33 \pm 0.03\,\mathrm{R}_\odot$, consistent with a dwarf of spectral type F8. Assuming a main-sequence mass-radius relation for the star, we fitted simultaneously the radial velocity variations and the transit light curves to estimate the orbital and planetary parameters. The planet has a mass of $2.69 \pm 0.06\ \mathrm{M_{Jup}}$ and a radius of $1.09 \pm 0.03\,\mathrm{R_{Jup}}$ giving a density, $\rho_p = 2.1 \pm 0.1\, \rho_J$. The high precision of the eccentricity $e = 0.0314 \pm 0.0044$ is due to the relative transit timing from the light curves and the RV shape. The planet equilibrium temperature is estimated at $1292 \pm 33\,\mathrm{K}$. WASP-38b is the longest period planet found by SuperWASP-North and with a bright host star (V = 9.4 mag), is a good candidate for followup atmospheric studies.

Download/Website: `http://arxiv.org/abs/1010.0849`

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Near-Infrared Spectroscopy of the Extrasolar Planet HR 8799 b

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Astrophysical Journal, 2010ApJ...723..850B

We present 2.12-2.23 μm high contrast integral field spectroscopy of the extrasolar planet HR 8799 b. Our observations were obtained with OSIRIS on the Keck II telescope and sample the 2.2 μm CH_4 feature, which is useful for spectral classification and as a temperature diagnostic for ultracool objects. The spectrum of HR 8799 b is relatively featureless, with little or no methane absorption, and does not exhibit the strong CH_4 seen in T dwarfs of similar absolute magnitudes. The spectrum is consistent with field objects from early-L to T4 (3 σ confidence level), with a best-fitting type of T2. A similar analysis of the published 1-4 μm photometry shows the infrared SED matches L5-L8 field dwarfs, especially the reddest known objects which are believed to be young and/or very dusty. Overall, we find that HR 8799 b has a spectral type consistent with L5-T2, although its SED is atypical compared to most field objects. We fit the 2.2 μm spectrum and the infrared SED using the Hubeny & Burrows, Burrows et al., and Ames-Dusty model atmosphere grids, which incorporate nonequilibrium chemistry, non-solar metallicities, and clear and cloudy variants. No models agree with all of the data, but those with intermediate clouds produce significantly better fits. The largest discrepancy occurs in the J-band, which is highly suppressed in HR 8799 b. Models with high eddy diffusion coefficients and high metallicities are somewhat preferred over those with equilibrium chemistry and solar metallicity. The best-fitting effective temperatures range from 1300–1700 K with radii between ~0.3–0.5 $R_{\rm Jup}$. These values are inconsistent with evolutionary model-derived values of 800-900 K and 1.1–1.3 $R_{\rm Jup}$ based on the luminosity of HR 8799 b and the age of HR 8799, a discrepancy that probably results from imperfect atmospheric models or the limited range of physical parameters covered by the models. The low temperature inferred from evolutionary models indicates that HR 8799 b is ~400 K cooler than field L/T transition objects, providing further evidence that the L/T transition is gravity-dependent. With an unusually dusty photosphere, an exceptionally low luminosity for its spectral type, and hints of extreme secondary physical parameters, HR 8799 b appears to be unlike any class of field brown dwarf currently known.

Download/Website: `http://adsabs.harvard.edu/abs/2010ApJ...723..850B`

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Too Little, Too Late: How the Tidal Evolution of Hot Jupiters affects Transit Surveys of Clusters

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Astrophysical Journal, 2010 723 1703

The tidal evolution of hot Jupiters may change the efficiency of transit surveys of stellar clusters. The orbital decay that hot Jupiters suffer may result in their destruction, leaving fewer transiting planets in older clusters. We calculate the impact tidal evolution has for different assumed stellar populations, including that of 47 Tuc, a globular cluster that was the focus of an intense HST search for transits. We find that in older clusters one expects to detect fewer transiting planets by a factor of two for surveys sensitive to Jupiter-like planets in orbits out to 0.5 AU, and up to a factor of 25 for surveys sensitive to Jupiter-like planets in orbits out to 0.08 AU. Additionally, tidal evolution affects the distribution of transiting planets as a function of semi-major axis, producing larger orbital period gaps for transiting planets as the age of the cluster increases. Tidal evolution can explain the lack of detected exoplanets in 47 Tuc without invoking other mechanisms. Four open clusters residing within the *Kepler* fields of view have ages that span 0.4-8 Gyr–if *Kepler* can observe a significant number of planets in these clusters, it will provide key tests for our tidal evolution hypothesis. Finally, our results suggest that observers wishing to discover transiting planets

in clusters must have sufficient accuracy to detect lower mass planets, search larger numbers of cluster members, or have longer observation windows to be confident that a significant number of transits will occur for a population of stars.

Download/Website: `http://arxiv.org/abs/1009.1399`

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WASP-25b: a 0.6 M_J planet in the Southern hemisphere

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Monthly Notices of the Royal Astronomical Society, in press (arXiv:1009.5917)

We report the detection of a 0.6 M_J extrasolar planet by WASP-South, WASP-25b, transiting its solar-type host star every 3.76 days. A simultaneous analysis of the WASP, FTS and Euler photometry and CORALIE spectroscopy yields a planet of R_p = 1.22 R_J and M_p = 0.58 M_J around a slightly metal-poor solar-type host star, [Fe/H] = -0.05±0.10, of R_* = 0.92 $R_\odot$ and M_* = 1.00 $M_\odot$. WASP-25b is found to have a density of $\rho_p = 0.32\ \rho_J$, a low value for a sub-Jupiter mass planet. We investigate the relationship of planetary radius to planetary equilibrium temperature and host star metallicity for transiting exoplanets with a similar mass to WASP-25b, finding that these two parameters explain the radii of most low-mass planets well.

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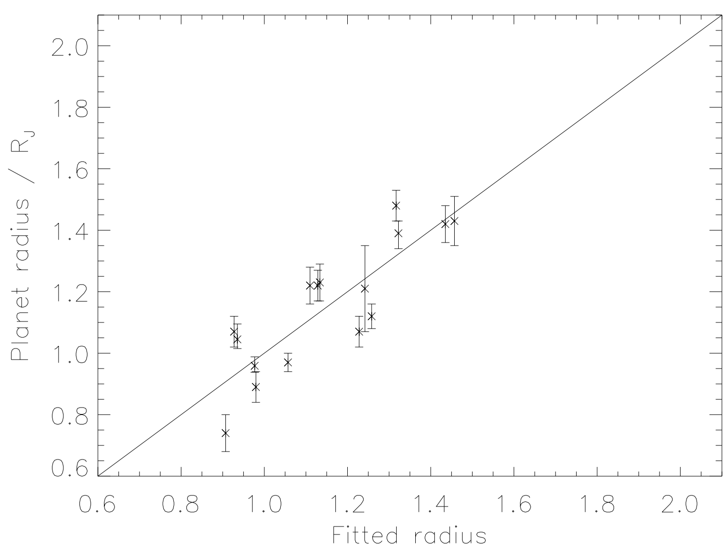

Figure 1: (Enoch et al.) Results of SVD fit on the radii of planets of 0.1-0.6 M_J, excluding WASP-17b and HD 149026b, using planetary equilibrium temperature and host star metallicity.

SOPHIE velocimetry of *Kepler* transit candidates. I. Detection of the low-mass white dwarf KOI 74b

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Astronomy & Astrophysics, in press (arXiv:1009.1873)

The *Kepler* mission has detected transits and occultations of a hot compact object around an early-type star, the Kepler Object of Interest KOI 74. The mass of this transiting object was photometrically assessed in a previous study using the presence of the relativistic beaming effect (so-called 'Doppler boosting') in the light curve. Our aim was to provide a spectroscopic validation of this pioneering approach. We measured the radial velocity variations of the A1V star KOI 74 with the SOPHIE spectrograph at the 1.93-m telescope of the Observatoire de Haute-Provence (France). Radial velocity measurements of this star are challenging because of the high level of stellar pulsations and the few available spectral lines. Using a technique dedicated to early-type main-sequence stars, we measured radial velocity variations compatible with a companion of mass $0.252 \pm 0.025\,\mathrm{M}_\odot$, in good agreement with the value derived from the *Kepler* light curve. This work strengthens the scenario suggesting that KOI 74 is a blue straggler orbited by a stellar core despoiled of its envelope, the low-mass white dwarf KOI 74b.

Download/Website: `http://arxiv.org/abs/1009.1873`

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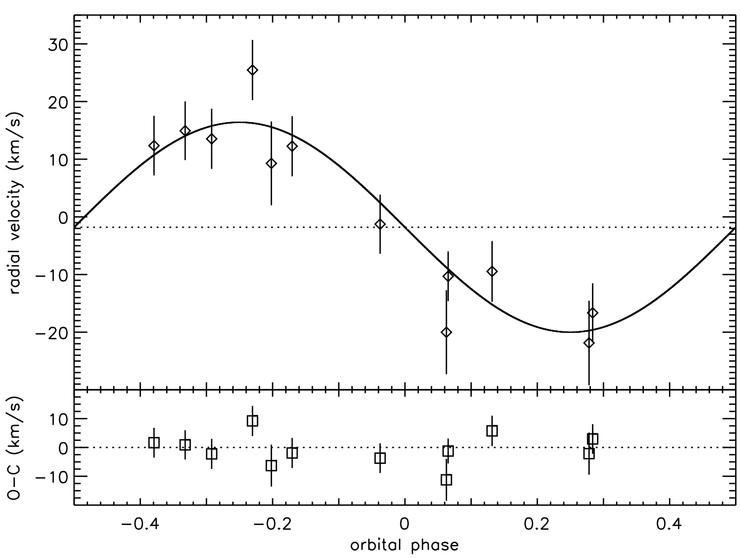

Figure 2: (Ehrenreich et al.) *Top:* SOPHIE phase-folded radial velocities (diamonds). Each point and its error bar (including the jitter dispersion) result from the average of all points obtained on the same night. The black line is the best Keplerian fit to the data. *Bottom:* Observed minus calculated residuals (squares).

Kepler-9: A System of Multiple Planets Transiting a Sun-Like Star, Confirmed by Timing Variations

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Science, 2010Sci...330...51H

The Kepler spacecraft is monitoring more than 150,000 stars for evidence of planets transiting those stars. We report the detection of two Saturn-size planets that transit the same Sun-like star, based on 7 months of Kepler observations. Their 19.2- and 38.9-day periods are presently increasing and decreasing at respective average rates of 4 and 39 minutes per orbit; in addition, the transit times of the inner body display an alternating variation of smaller amplitude. These signatures are characteristic of gravitational interaction of two planets near a 2:1 orbital resonance. Six radial-velocity observations show that these two planets are the most massive objects orbiting close to the star and substantially improve the estimates of their masses. After removing the signal of the two confirmed giant planets, we identified an additional transiting super-Earthsize planet candidate with a period of 1.6 days.

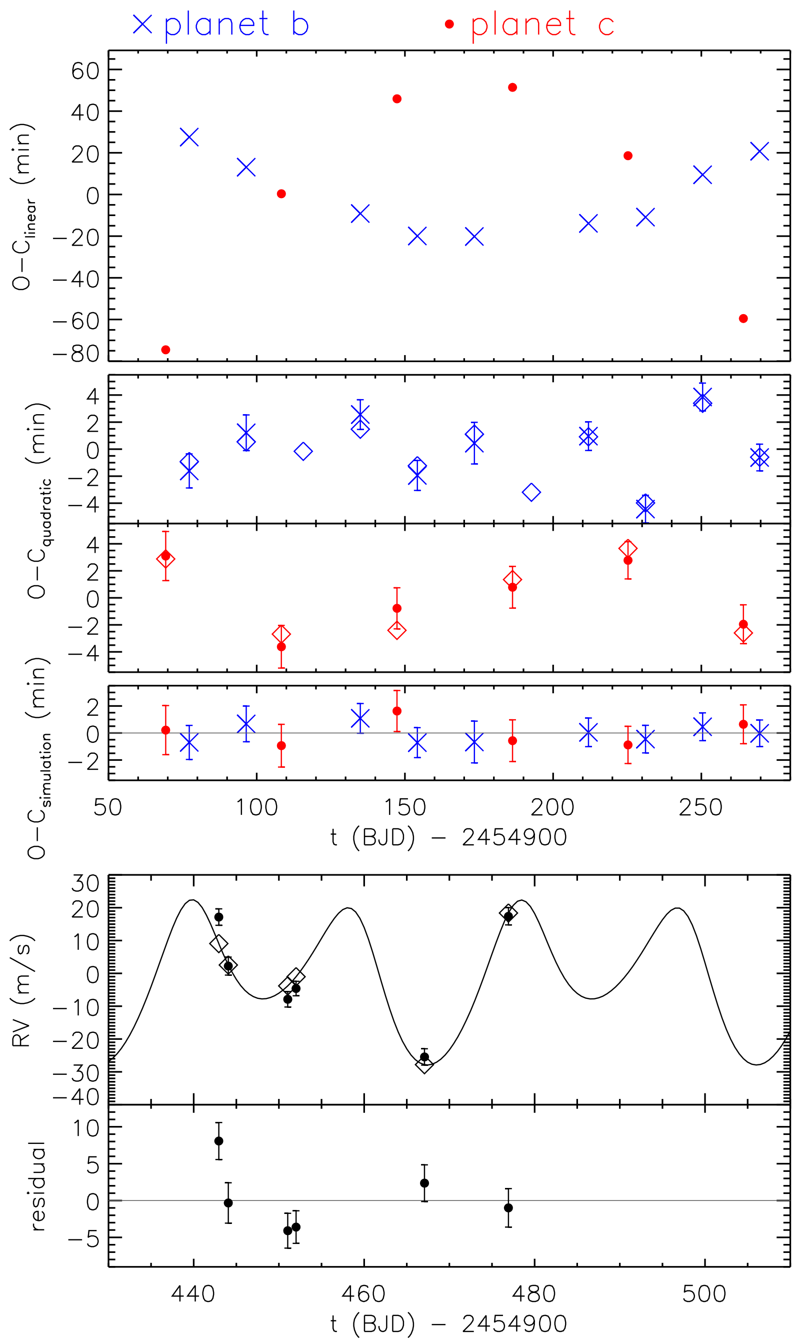

Figure 3: (Holman et al.) (Top) Offset of the observed transit times for planets 'b' (blue symbols) and 'c' (red dot symbols) compared to those calculated with linear ephemerides, quadratic ephemerides, and a dynamical model (diamonds) in which the planets fully interact. These calculations display the best-fit model. Only the diamond symbols are shown for events for which Kepler data were not available. (Bottom) A comparison of the observed RV (dots) with that predicted by the dynamical model (solid line and diamonds). Error bars indicate the uncertainties in the RV observations.

The Occurrence and Mass Distribution of Close-in Super-Earths, Neptunes, and Jupiters

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The questions of how planets form and how common Earth-like planets are can be addressed by measuring the distribution of exoplanet masses and orbital periods. We report the occurrence rate of close-in planets (with orbital periods less than 50 days) based on precise Doppler measurements of 166 Sun-like stars. We measured increasing planet occurrence with decreasing planet mass (M). Extrapolation of a power law mass distribution fitted to our measurements, $\mathrm{d}f/\mathrm{d}\log M = 0.39M^{-0.48}$, predicts that 23% of stars harbor a close-in Earth-mass planet (ranging from 0.5 to 2.0 Earth-masses). Theoretical models of planet formation predict a deficit of planets in the domain from 5 to 30 Earth-masses and with orbital periods less than 50 days. This region of parameter space is in fact well populated, implying that such models need substantial revision.

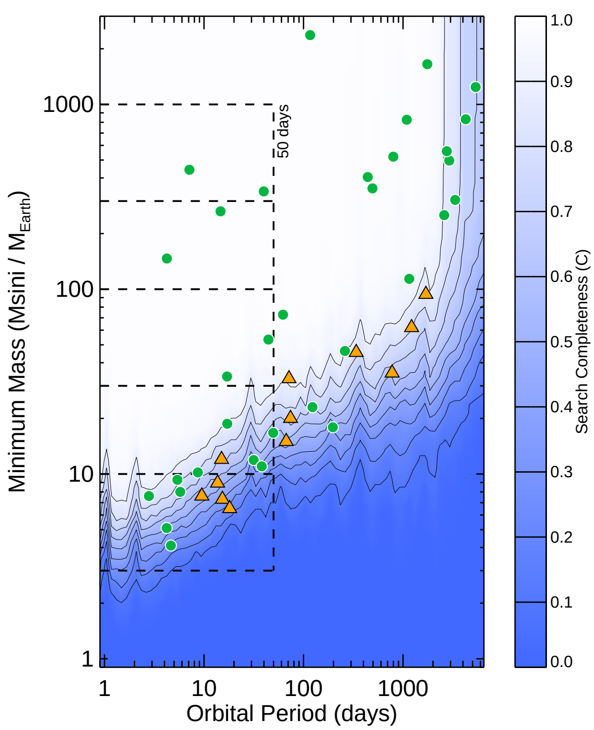

Figure 4: (Howard et al.) Detected planets (green circles) and candidate planets (orange triangles) from the NASA-UC Eta-Earth Survey as a function of orbital period and minimum mass. Five mass domains—3–10, 10–30, 30–100, 100–300, 300–1000 Earth-masses—out to 50 day orbits are marked with dashed lines. Search completeness—the fraction of stars with sufficient measurements to rule out planets in circular orbits of a given minimum mass and orbital period—is shown as blue contours from 0.0 to 1.0 in steps of 0.1. We detect strongly increasing planet occurrence with decreasing planet mass, despite reduced sensitivity at the lowest masses. Planets with $M \sin i$ = 10–100 $\mathrm{M_{Earth}}$ and $P < 20$ days are almost entirely absent. There is also an over-density of planets starting at $P < 10$ days and $M \sin i$ = 4–10 $\mathrm{M_{Earth}}$ and extending to higher masses and longer periods. These patterns suggest different formation and migration mechanisms for close-in low-mass planets compared to massive gas-giant planets.

Habitability of exoplanetary systems with planets observed in transit

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Monthly Notices of the Royal Astronomical Society, 2010MNRAS.407.1259J

We have used the measured properties of the stars in the 79 exoplanetary systems with one or more planets that have been observed in transit, to estimate each systems present habitability. Such systems have the advantage that the inclination of the planetary orbits is known, and therefore the actual mass of the planet can be obtained, rather than the minimum mass in the many systems that have been observed only with the radial velocity technique. The measured stellar properties have been used to determine the present location of the classical habitable zone (HZ). To establish habitability we use the estimated distances from the giant planet(s) within which an Earth-like planet would be inside the gravitational reach of the giant. These distances are given by nR_H, where R_H is the Hill radius of the giant planet and n is a multiplier that depends on the giants orbital eccentricity e_G and on whether the orbit of the Earth-like planet is interior or exterior to the giant planet. We obtained $n_{int}(e_G)$ and $n_{ext}(e_G)$ in earlier work and summarize those results here. We then evaluate the present habitability of each exoplanetary system by examining the penetration of the giant planet(s) gravitational reach into the HZ. Of the 79 transiting systems known in 2010 April, only two do not offer safe havens to Earth-like planets in the HZ, and thus could not support life today. We have also estimated whether habitability is possible for 1.7 Gyr into the past, i.e. 0.7 Gyr for a heavy bombardment, plus 1.0 Gyr for life to emerge and thus be present today. We find that, for the best estimate of each stellar age, an additional 28 systems do not offer such sustained habitability. If we reduce 1.7 Gyr to 1.0 Gyr, this number falls to 22. However, if giant planets orbiting closer to the star than the inner boundary of the HZ have got there by migration through the HZ, and if this ruled out the subsequent formation of Earth-like planets, then, of course, none of the presently known transiting exoplanetary systems offers habitability. Fortunately, this bleak conclusion could well be wrong. As well as obtaining results on the 79 transiting systems, this paper demonstrates a method for determining the habitability of the cornucopia of such systems that will surely be discovered over the next few years.

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Stability of magnetized disks and implications for planet formation

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Astrophysical Journal, in press, arXive:1009.5717

This paper considers gravitational perturbations in geometrically thin disks with rotation curves dominated by a central object, but with substantial contributions from magnetic pressure and tension. The treatment is general, but the application is to the circumstellar disks that arise during the gravitational collapse phase of star formation. We find the dispersion relation for spiral density waves in these generalized disks and derive the stability criterion for axisymmetric $(m = 0)$ disturbances (the analog of the Toomre parameter Q_T) for any radial distribution of the mass-to-flux ratio λ. The magnetic effects work in two opposing directions: on one hand, magnetic tension and pressure stabilize the disk against gravitational collapse and fragmentation; on the other hand, they also lower the rotation rate making the disk more unstable. For disks around young stars the first effect generally dominates, so that magnetic fields allow disks to be stable for higher surface densities and larger total masses. These results indicate that magnetic fields act to suppress the formation of giant planets through gravitational instability. Finally, even if gravitational instability can form a secondary body, it must lose an enormous amount of magnetic flux in order to

become a planet; this latter requirement represents an additional constraint for planet formation via gravitational instability and places a lower limit on the electrical resistivity.

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Conjugate-plane photometry: Reducing scintillation in ground-based photometry

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Monthly Notices of the Royal Astronomical Society, in press (arXiv:1009.5261)

High precision fast photometry from ground-based observatories is a challenge due to intensity fluctuations (scintillation) produced by the Earth's atmosphere. Here we describe a method to reduce the effects of scintillation by a combination of pupil reconjugation and calibration using a comparison star. Because scintillation is produced by high altitude turbulence, the range of angles over which the scintillation is correlated is small and therefore simple correction by a comparison star is normally impossible. We propose reconjugating the telescope pupil to a high dominant layer of turbulence, then apodizing it before calibration with a comparison star. We find by simulation that given a simple atmosphere with a single high altitude turbulent layer and a strong surface layer a reduction in the intensity variance by a factor of 30 is possible. Given a more realistic atmosphere as measured by SCIDAR at San Pedro Martir we find that on a night with a strong high altitude layer we can expect the median variance to be reduced by a factor of 11. By reducing the scintillation noise we will be able to detect much smaller changes in brightness. If we assume a 2 m telescope and an exposure time of 30 seconds a reduction in the scintillation noise from 0.78 mmag to 0.21 mmag is possible, which will enable the routine detection of, for example, the secondary transits of extrasolar planets from the ground.

Download/Website: `http://arxiv.org/abs/1009.5261`

Contact: `james.osborn@durham.ac.uk, vik.dhillon@sheffield.ac.uk`

The cold origin of warm dust around ε Eridani

M. Reidemeister[1], *A. V. Krivov*[1], *C. C. Stark*[2], *J.-C. Augereau*[3], *T. Löhne*[1] *and S. Müller*[1]

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[2] Department of Physics, University of Maryland, Box 197, 082 Regents Drive, College Park, MD 20742-4111
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Astronomy & Astrophysics, accepted

The nearby K2 V star ε Eridani hosts one known inner planet, an outer Kuiper belt analog, and an inner disk of warm dust. Spitzer/IRS measurements indicate that the warm dust is present at distances as small as a few AU from the star. Its origin is puzzling, since an "asteroid belt" that could produce this dust would be unstable because of the known inner planet.

In our paper we test a hypothesis that the observed warm dust is generated by collisions in the outer belt and is transported inward by Poynting-Robertson drag and strong stellar winds.

We simulated a steady-state distribution of dust particles outside $10\,\mathrm{AU}$ with a collisional code and in the inner region ($r < 10\,\mathrm{AU}$) with single-particle numerical integrations. By assuming homogeneous spherical dust grains composed of ice and astrosilicate, we calculated the thermal emission of the dust and compared it with observations. We investigated two different orbital configurations for the inner planet inferred from radial velocity measurements,

one with a highly eccentric orbit of $e = 0.7$ and another one with a moderate eccentricity of $e = 0.25$. We also produced a simulation without a planet.

Since our models can reproduce the shape and magnitude of the observed spectral energy distribution from mid-infrared to submillimeter wavelengths, as well as the Spitzer/MIPS radial brightness profiles, we conclude that the observed warm dust in the ε Eridani system can indeed stem from the outer "Kuiper belt" and be transported inward by Poynting-Robertson and stellar wind drag. The inner planet has little effect on the distribution of dust, so that the planetary orbit could not be constrained. Reasonable agreement between the model and observations can only be achieved by relaxing the assumption of purely silicate dust and assuming a mixture of silicate and water ice in comparable amounts.

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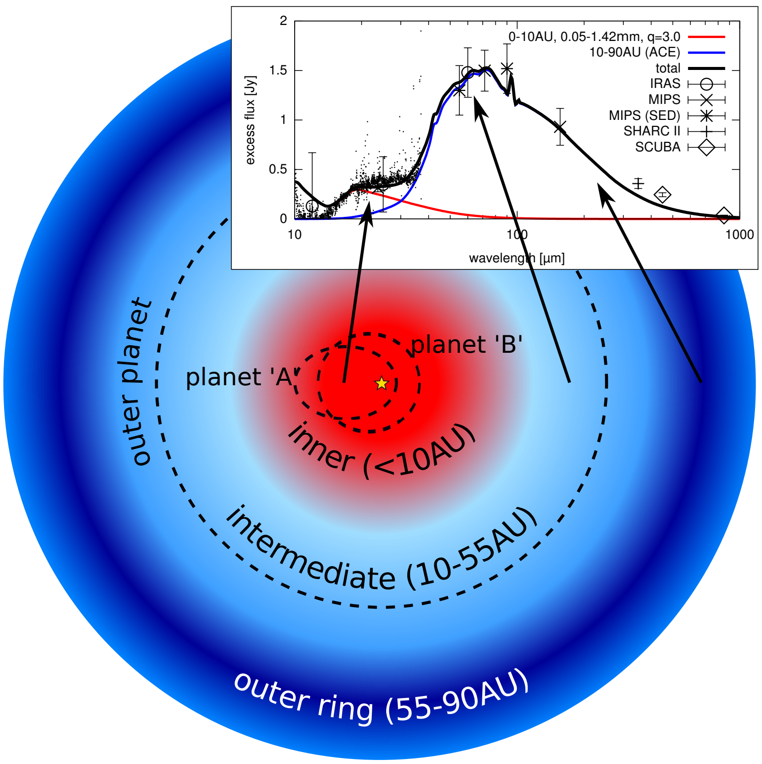

Figure 5: (Reidemeister et al.) A schematic view of the ε Eridani system's architecture. The outer part of the sketch (> 10 AU) is not to scale. *Inset:* The observed SED with Spitzer/IRS spectrum (dots) and photometry points (symbols with error bars) compared to the thermal emission calculated from our model.

Debris discs in the 27 Myr old open cluster IC4665

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Monthly Notices of the Royal Astronomical Society, in press arXiv:1010.2042

We present Spitzer IRAC and MIPS 24μm imaging of members of the 27$\pm$5Myr old open cluster IC 4665. Models for the assembly of terrestrial planets through planetesimal collisions and mergers predict episodic dust debris discs at this epoch. We determine that 42^{+18}_{-13}% of the solar-type (F5-K5) cluster members have excess emission at 24μm indicative of these debris discs, the highest frequency of the clusters studied with Spitzer to date. The majority of these discs have intermediate levels of excess ($F_{24}/F_{\rm phot} < 2$), and no source is found to have extreme levels of excess indicative of a recent transient event as opposed to steady-state collisional evolution. We find no evidence of a link between multiplicity and 24μm excess in this cluster sample. Only the early-type star TYC424-473-1 ($T_{\rm eff} \sim 8420K$) has significant near-infrared excess from 4.5μm as measured with IRAC. Two solar-type targets have low significance 8μm excess but no significant 24μm excess. All other targets show no evidence for near-infrared excess which could indicate the presence of an optically thick primordial disc, demonstrating the observed 24μm excess arises from a debris disc.

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A High-Contrast Imaging Survey of SIM Lite Planet Search Targets

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[3] Dunlap Institute for Astronomy and Astrophysics, University of Toronto, 50 St. George St., Toronto Ontario, Canada,M5S 3H4

PASP, published (2010PASP..122.1195T)

With the development of extreme high contrast ground-based adaptive optics instruments and space missions aimed at detecting and characterizing Jupiter- and terrestrial-mass planets, it is critical that each target star be thoroughly vetted to determine whether it is a viable target, given both the instrumental design and scientific goals of the program. With this in mind, we have conducted a high-contrast imaging survey of mature AFGKM stars with the PALAO/PHARO instrument on the Palomar 200 inch telescope. The survey reached sensitivities sufficient to detect brown dwarf companions at separations of $>$50 AU. The results of this survey will be utilized both by future direct imaging projects such as GPI, SPHERE, and P1640 and indirect detection missions such as SIM Lite. Out of 84 targets, all but one have no close-in (0.45-1”) companions and 64 (76%) have no stars at all within the 25” field of view. The sensitivity contrasts in the Ks passband ranged from 4.5 to 10 for this set of observations. These stars were selected as the best nearby targets for habitable planet searches because of their long-lived habitable zones (¿1 billion years). We report two stars, GJ 454 and GJ 1020, with previously unpublished proper motion companions. In both cases, the companions are stellar in nature and are most likely M dwarfs based on their absolute magnitudes and colors. Based on our mass sensitivities and level of completeness, we can place an upper limit of 17

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3 Abstracts of theses

The Evolution of Gas and Dust in Protoplanetary Accretion Disks

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Doctoral Thesis, University of Heidelberg, Germany, October 2010

Dust constitutes only about one percent of the mass of circumstellar disks, yet it is of crucial importance for the modeling of planet formation, disk chemistry, radiative transfer and observations. The initial growth of dust from sub-μm sized grains to planetesimals and also the radial transport of dust in disks around young stars is the topic of this thesis. Circumstellar dust is subject to radial drift, vertical settling, turbulent mixing, collisional growth, fragmentation and erosion.
We approach this subject from three directions: analytical calculations, numerical simulations, and comparison to observations. We describe the physical and numerical concepts that go into a model which is able to simulate the radial and size evolution of dust in a gas disk which is viscously evolving over several million years. The resulting dust size distributions are compared to our analytical predictions and a simple recipe for obtaining steady-state dust size distributions is derived. With the numerical model at hand, we show that grain fragmentation can explain the fact that circumstellar disks are observed to be dust-rich for several million years. Finally, we investigate the challenges that observations present to the theory of grain evolution, namely that grains of millimeter sizes are observed at large distances from the star. We have found that under the assumption that radial drift is ineffective, we can reproduce some of the observed spectral indices and fluxes. Fainter objects point towards a reduced dust-to-gas ratio or lower dust opacities.

Download/Website: `http://www.ub.uni-heidelberg.de/archiv/11147`

Contact: `birnstiel@mpia.de`

4 Conference announcements

Signposts of Planets

Marc J. Kuchner

NASA Goddard Space Flight Center, April 12-14, 2011

When you see a circumstellar disk, what does it tell you about the underlying planetary system? We will discuss disks from T Tauri disks to transitional disks to debris disks to exozodiacal clouds, and all the possible signatures of planets: gaps, rings, warps, clumps, spiral density waves, and so on. The conference will be limited to 150 attendees.

Download/Website: `http://science.gsfc.nasa.gov/667/conferences/signposts.html`

Contact: `sandra.l.barnes@nasa.gov`

ExoPAG meeting

J. F. Kasting[1,2]
[1] Department Of Geosciences, The Pennsylvania State University, University Park, PA - 16802
[2] ExoPAG Chair

Seattle, Washington, USA, January 8-9

NASA's Exoplanet Exploration Program Analysis Group (ExoPAG) will hold its third meeting on January 8-9, 2011, just prior to the AAS meeting in Seattle. The main topic for discussion will be how the exoplanet community should respond to the Astro2010 Decadal Survey. As most researchers in the field are already aware, the Astro2010 committee did not recommend a dedicated exoplanet space mission in this decade (although there is a gravitational microlensing component to the top recommended mission, WFIRST). The committee did recognize that the exoplanet field is exploding, and they recommended that technology funding for a direct exoplanet imaging mission – some kind of Terrestrial Planet Finder (TPF) telescope – be increased significantly starting about 2015, after JWST has launched. If this funding is to be used effectively so that a credible TPF mission can be proposed in 2020, it will likely be necessary to do a downselect between competing TPF technologies (internal coronagraphs, external occulters, or infrared imaging interferometers) well before that time. At the meeting, we will discuss what role the ExoPAG might play in helping NASA decide which TPF architecture to pursue.

There are other issues to discuss, as well. Some exoplanet scientists feel that it might be better to focus on smaller probe missions rather than a single large flagship mission. The exozodiacal light is still an unknown source of background noise for a direct imaging mission. The loss of SIM Lite means that there will be no easy way of determining the true mass of most non-transiting planets for the foreseeable future. This may also mean that it will be difficult to develop a good target list for a TPF mission, although ground-based RV may or may not be able to help with this task. The ExoPAG meeting will be a good time to discuss all of these issues, along with other ideas that people may bring with them. So, please join us at the ExoPAG meeting in Seattle and help us help NASA figure out the most productive way to pursue exoplanet research over the next few years.

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

Contact: `jfk4@psu.edu`

5 Jobs and Positions

Postdoctoral Position in Exoplanet Detection

Jason T Wright
Penn State University, Department of Astronomy

University Park, PA, Summer/Fall 2010

One postdoctoral research position in stellar and exoplanetary astrophysics is available in the Department of Astronomy and Astrophysics and the Center for Exoplanets and Habitable Worlds at the Pennsylvania State University. A PhD in astrophysics or related field is required. The initial appointment will be for one year, renewable to a total of three years contingent upon continued funding and can begin as early as summer 2011.
The ideal applicant will have:

- experience acquiring and reducing optical and/or NIR spectra;
- a desire to work with and assist in advising graduate and undergraduate students; and

- a background in observational stellar astrophysics, especially cool stars, and/or exoplanet detection or characterization.

The successful applicant will:

- hold a 50% position working with Dr. Jason T Wright on the acquisition and interpretation of precise radial velocity data from the Hobby-Eberly Telescope and other instruments;
- hold a 50% position as an independent Center for Exoplanets and Habitable Worlds postdoc;
- pursue independent research and contribute to the vibrant scientific and public outreach efforts of the department;
- have access to Penn State's facilities, including the 11-m Hobby-Eberly Telescope.

Applicants should submit electronic applications (pdf, postscript, or text) containing a curriculum vitae, list of publications, brief statement of research interests and relevant experience, and contact information for three references to jtwright@astro.psu.edu. Interviews will be conducted at the 217th AAS meeting in Seattle, and the position will be filled soon thereafter.
The Department of Astronomy at Penn State University hosts 33 research and instructional faculty members, 33 research and instructional staff and postdocs, and 29 graduate students. The Department also has connections to numerous research centers on campus, including the Center for Astrostatistics and the Penn State Astrobiology Research Center. Penn State is committed to affirmative action, equal opportunity and the diversity of its workforce.

Download/Website: `http://www.astro.psu.edu/index.php/employment`

Contact: `jtwright@astro.psu.edu`

6 As seen on astro-ph

The following list contains all the entries relating to exoplanets that we spotted on astro-ph during October 2010. If you spot any that we missed, please let us know and we'll include them in the next issue. And of course, the best way to ensure we include your paper is to send us the abstract.

Exoplanets

astro-ph/1010.0179: **Transiting exoplanets from the CoRoT space mission. XV. CoRoT-15b: a brown dwarf transiting companion** by *F. Bouchy, M. Deleuil, T. Guillot et al.*

astro-ph/1010.0277: **Thermal evolution and interior models of the transiting super-Earth GJ 1214b** by *N. Nettelmann, J. J. Fortney, U. Kramm et al.*

astro-ph/1010.0849: **WASP-38b: A Transiting Exoplanet in an Eccentric, 6.87d Period Orbit** by *S. C. C. Barros, F. Faedi, A. Collier Cameron et al.*

astro-ph/1010.0856: **The HARPS search for southern extra-solar planets. XXIV. Companions to HD 85390, HD 90156 and HD 103197: A Neptune analogue and two intermediate mass planets** by *C. Mordasini, M. Mayor, S. Udry et al.*

astro-ph/1010.0884: **Transit timing variations in eccentric hierarchical triple exoplanetary systems. I. Long-term (P_2-time-scale) perturbations** by *Tamas Borkovits, Szilard Csizmadia, Emese Forgacs-Dajka et al.*

astro-ph/1010.0966: **The barycentric motion of exoplanet host stars: tests of solar spin-orbit coupling** by *M. A. C. Perryman, T. Schulze-Hartung*

astro-ph/1010.1008: **HAT-P-26b: A Low-Density Neptune-Mass Planet Transiting a K Star** by *J. D. Hartman, G. A. Bakos, D. M. Kipping et al.*

astro-ph/1010.1032: **Comparison of current models for Hot Jupiters to the sample of transiting exoplanets** by *Michael Lund, Damian J. Christian*

astro-ph/1010.1078: **An analysis of the CoRoT-2 system: A young spotted star and its inflated giant planet** by *Tristan Guillot, Mathieu Havel*

astro-ph/1010.1173: **WASP-33: The first delta Scuti exoplanet host star and evidence of star-planet interactions** by *E. Herrero, J.C. Morales, R. Naves et al.*

astro-ph/1010.1257: **Atmospheric circulation of tidally-locked exoplanets: a suite of benchmark tests for dynamical solvers** by *Kevin Heng, Kristen Menou, Peter J. Phillipps*

astro-ph/1010.1318: **Orbital Orientations of Exoplanets: HAT-P-4b is Prograde and HAT-P-14b is Retrograde** by *Joshua N. Winn, Andrew W. Howard, John Asher Johnson et al.*

astro-ph/1010.1573: **A Comment on "The Far Future of Exoplanet Direct Characterization" - the Case for Interstellar Space Probes** by *Ian A. Crawford*

astro-ph/1010.1632: **Rotation of the Solar System planets and the origin of the Moon in the context of the tidal downsizing hypothesis** by *Sergei Nayakshin*

astro-ph/1010.1753: **A new look at NICMOS transmission spectroscopy of HD189733, GJ-436 and XO-1: no conclusive evidence for molecular features** by *Neale P. Gibson, Frederic Pont, Suzanne Aigrain et al.*

astro-ph/1010.1809: **A sub-Saturn Mass Planet, MOA-2009-BLG-319Lb** by *N. Miyake, T. Sumi, Subo Dong et al.*

astro-ph/1010.2038: **Reply to 'A Comment on '"The Far Future of Exoplanet Direct Characterization" - the Case for Interstellar Space Probes'** by *Jean Schneider*

astro-ph/1010.2197: **Extreme Climate Variations from Milankovitch-like Eccentricity Oscillations in Extrasolar Planetary Systems** by *David S. Spiegel*

astro-ph/1010.2451: **Transmission Spectra of Transiting Planet Atmospheres: Simulations of the Hot Neptune GJ 436b and Prospects for JWST** by *Megan Shabram, Jonathan J. Fortney, Thomas P. Greene et al.*

astro-ph/1010.2492: **How to Weigh a Star Using a Moon** by *David M. Kipping*

astro-ph/1010.3006: **WASP-30b: a 61 Mjup brown dwarf transiting a V=12, F8 star** by *D. R. Anderson, A. Collier Cameron, C. Hellier et al.*

astro-ph/1010.3118: **Towards the Rosetta Stone of planet formation** by *G.Maciejewski, R.Neuhaeuser, R.Errmann et al.*

astro-ph/1010.3122: **A search for transit timing variation** by *G.Maciejewski, R.Neuhaeuser, St.Raetz et al.*

astro-ph/1010.3292: **A Spitzer IRS Study of Debris Disks Around Planet-Host Stars** by *Sarah E. Dodson-Robinson, C. A. Beichman, John M. Carpenter et al.*

astro-ph/1010.3474: **The Doppler Shadow of WASP-3b: A tomographic analysis of Rossiter-McLaughlin observations** by *G. R. M. Miller, A. Collier Cameron, E. K. Simpson et al.*

astro-ph/1010.3705: **A Population of Very-Hot Super-Earths in Multiple-Planet Systems Should be Uncovered by Kepler** by *Kevin C. Schlaufman, D.N.C. Lin, S. Ida*

astro-ph/1010.4025: **Discerning Exoplanet Migration Models Using Spin-Orbit Measurements** by *Timothy D. Morton, John Asher Johnson*

astro-ph/1010.4041: **The PHASES Differential Astrometry Data Archive. I. Measurements and Description** by *Matthew W. Muterspaugh, Benjamin F. Lane, S. R. Kulkarni et al.*

astro-ph/1010.4043: **The PHASES Differential Astrometry Data Archive. II. Updated Binary Star Orbits and a Long Period Eclipsing Binary** by *Matthew W. Muterspaugh, William I. Hartkopf, Benjamin F. Lane et al.*

astro-ph/1010.4044: **The PHASES Differential Astrometry Data Archive. III. Limits to Tertiary Companions** by *Matthew W. Muterspaugh, Benjamin F. Lane, S. R. Kulkarni et al.*

astro-ph/1010.4045: **The PHASES Differential Astrometry Data Archive IV: The Triple Star Systems 63 Gem A and HR 2896** by *Matthew W. Muterspaugh, Francis C. Fekel, Benjamin F. Lane et al.*

astro-ph/1010.4048: **The PHASES Differential Astrometry Data Archive. V. Candidate Substellar Companions to Binary Systems** by *Matthew W. Muterspaugh, Benjamin F. Lane, S. R. Kulkarni et al.*

astro-ph/1010.4106: **Kepler Observations of Three Pre-Launch Exoplanet Candidates: Discovery of Two Eclipsing Binaries and a New Exoplanet** by *Steve B. Howell, Jason F. Rowe, William Sherry et al.*
astro-ph/1010.4329: **A precise asteroseismic age and radius for the evolved Sun-like star KIC 11026764** by *T.S. Metcalfe, M.J.P.F.G. Monteiro, M.J. Thompson et al.*
astro-ph/1010.4591: **Possible thermochemical disequilibrium in the atmosphere of the exoplanet GJ 436b** by *Kevin B. Stevenson, Joseph Harrington, Sarah Nymeyer et al.*
astro-ph/1010.4585: **On the Inference of Thermal Inversions in Hot Jupiter Atmospheres** by *N. Madhusudhan, S. Seager*
astro-ph/1010.4591: **Possible thermochemical disequilibrium in the atmosphere of the exoplanet GJ 436b** by *Kevin B. Stevenson, Joseph Harrington, Sarah Nymeyer et al.*
astro-ph/1010.4719: **Gliese 581g as a scaled-up version of Earth: atmospheric circulation simulations** by *Kevin Heng, Steven S. Vogt*
astro-ph/1010.4762: **Powerful Winds from Low-Mass Stars: V374 Peg** by *A. A. Vidotto, M. Jardine, M. Opher et al.*
astro-ph/1010.5061: **The role of the initial surface density profiles of the disc on giant planet formation: comparing with observations** by *Yamila Miguel, Octavio M. Guilera, Adrian Brunini*
astro-ph/1010.5133: **The melting curve of iron at extreme pressures: implications for planetary cores** by *G.Morard, J.Bouchet, D.Valencia et al.*
astro-ph/1010.5317: **Thermal evolution and lifetime of intrinsic magnetic fields of Super Earths in habitable zones** by *Chihiro Tachinami, Hiroki Senshu, Shigeru Ida*
astro-ph/1010.5383: **Radio Observations of HD 80606 Near Planetary Periastron** by *T. J.W. Lazio, P. D. Shankland, W. M. Farrell et al.*
astro-ph/1010.5385: **Effects of rotation and magnetic fields on the lithium abundance and asteroseismic properties of exoplanet-host stars** by *P. Eggenberger, A. Maeder, G. Meynet*
astro-ph/1010.5527: **Statistics and Universality in Simplified Models of Planetary Formation** by *C. Hernandez-Mena, L. Benet*
astro-ph/1010.5576: **Photometric variability of the Be star CoRoT-ID 102761769** by *M. Emilio, L. Andrade, E. Janot-Pacheco et al.*
astro-ph/1010.5632: **A search for Star-Planet-Interactions in the upsilon Andromedae system at X-ray and optical wavelengths** by *K. Poppenhaeger, L. F. Lenz, A. Reine et al.*
astro-ph/1010.6067: **Evidence for Terrestrial Planetary System Remnants at White Dwarfs** by *J. Farihi*
astro-ph/1010.6272: **The Stellar Abundances for Galactic Archaeology (SAGA) Database II - Implications for Mixing and Nucleosynthesis in Extremely Metal-Poor Stars and Chemical Enrichment of the Galaxy** by *Takuma Suda, Shimako Yamada, Yutaka Katsuta et al.*

Disks

astro-ph/1010.0003: **The Structure of the Leonis Debris Disk** by *Nathan D. Stock, Kate Y.L. Su, Wilson Liu et al.*
astro-ph/1010.0176: **Type I Migration in Radiatively Efficient Discs** by *K. Yamada, S. Inaba*
astro-ph/1010.0248: **Forming Planetesimals by Gravitational Instability: I. The Role of the Richardson Number in Triggering the Kelvin-Helmholtz Instability** by *Aaron T. Lee, Eugene Chiang, Xylar Asay-Davis et al.*
astro-ph/1010.0250: **Forming Planetesimals by Gravitational Instability: II. How Dust Settles to its Marginally Stable State** by *Aaron T. Lee, Eugene Chiang, Xylar Asay-Davis et al.*
astro-ph/1010.1174: **Detection of a Molecular Disk Orbiting the Nearby, "Old," Classical T Tauri Star MP Mus** by *Joel H. Kastner, Pierry Hily-Blant, G. G. Sacco*
astro-ph/1010.1478: **Quantifying the Imprecision of Accretion Theory and Implications for Multi-Epoch Observations of Protoplanetary Discs** by *Eric G. Blackman, Farrukh Nauman, Richard G. Edgar*
astro-ph/1010.1489: **A numerical simulation of a "super-Earth" core delivery from 100 AU to 8 AU** by *Seung-Hoon Cha, Sergei Nayakshin*

astro-ph/1010.1668: **Short Lifetime of Protoplanetary Disks in Low-metallicity Environments** by *Chikako Yasui, Naoto Kobayashi, Alan T. Tokunaga*

astro-ph/1010.1962: **A Submillimeter Array Survey of Protoplanetary Disks in the Orion Nebula Cluster** by *Rita K. Mann, Jonathan P. Williams*

astro-ph/1010.2042: **Debris discs in the 27 Myr old open cluster IC4665** by *Rachel Smith, Rob Jeffries, Joana Oliveira*

astro-ph/1010.3016: **Millimeter imaging of MWC 758: probing the disk structure and kinematics** by *Andrea Isella, Antonella Natta, David Wilner et al.*

astro-ph/1010.4757: **High-resolution simulations of planetesimal formation in turbulent protoplanetary discs** by *Anders Johansen, Hubert Klahr, Thomas Henning*

astro-ph/1010.5061: **The role of the initial surface density profiles of the disc on giant planet formation: comparing with observations** by *Yamila Miguel, Octavio M. Guilera, Adrin Brunini*

astro-ph/1010.6218: **The Absence of Cold Dust and the Mineralogy and Origin of the Warm Dust Encircling BD +20 307** by *A. J. Weinberger, E. E. Becklin, I. Song*

Instrumentation and Techniques

astro-ph/1010.0397: **The HARPS polarimeter** by *Frans Snik, Oleg Kochukhov, Nikolai Piskunov et al.*

astro-ph/1010.1300: **The Magellan Adaptive Secondary VisAO Camera: Diffraction- Limited Broadband Visible Imaging and 20mas Fiber Array IFS** by *Derek Kopon, Laird M. Close, Jared R. Males et al.*

astro-ph/1010.2616: **Planetary detection limits taking into account stellar noise. I. Observational strategies to reduce stellar oscillation and granulation effects** by *Xavier Dumusque, Stephane Udry, Christophe Lovis et al.*

astro-ph/1010.4813: **The Application of Cloud Computing to Astronomy: A Study of Cost and Performance** by *G. Bruce Berriman, Ewa Deelman, Gideon Juve et al.*

astro-ph/1010.5581: **Detection Probability of a Low-Mass Planet for Triple Lens Events: Implication of Properties of Binary-Lens Superposition** by *Yoon-Hyun Ryu, Heon-Young Chang, Myeong-Gu Park*

astro-ph/1010.5940: **Detectability of Orbital Motion in Stellar Binary and Planetary Microlenses** by *Matthew T. Penny, Shude Mao, Eamonn Kerins*