ExoPlanet News
An Electronic Newsletter

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1 Editorial

Welcome to the fifty seventh edition of ExoPlanet News. This month's edition, as usual, has a great selection of recent abstracts, notices for meetings and conferences, job adverts, and other announcements that should be of interest to the exoplanet community. If regular readers would like to see anything additionally added to the newsletter, please drop me an e-mail.

The next edition of the newsletter is planned for early April 2013, so please send anything relevant over the next few weeks to exoplanet@open.ac.uk, and it will appear then. Some contributors have apparently had difficulty slotting notices about conferences and other announcements into the LaTeXtemplate provided, so I will attempt to make this a bit more self explanatory for next time.

Remember that past editions of this newsletter, submission templates and other information can be found at the ExoPlanet News website: http://exoplanet.open.ac.uk.

Best wishes
Andrew Norton
The Open University

2 Abstracts of refereed papers

Detection of molecular absorption in the dayside of exoplanet 51 Pegasi b?

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The Astrophysical Journal, in press (arXiv: 1302.6242)

In this paper we present ground-based high-resolution spectroscopy of 51 Pegasi using CRIRES at the Very Large Telescope. The system was observed for 3×5 hours at 2.3 μm at a spectral resolution of R = 100,000, targeting potential signatures from carbon monoxide, water vapour and methane in the planet's dayside spectrum. In the first 2×5 hours of data, we find a combined signal from carbon monoxide and water in absorption at a formal 5.9σ confidence level, indicating a non-inverted atmosphere. We derive a planet mass of $M_{\rm P} = (0.46 \pm 0.02) M_{\rm Jup}$ and an orbital inclination i between 79.6° and 82.2°, with the upper limit set by the non-detection of the planet transit in previous photometric monitoring. However, there is no trace of the signal in the final 5 hours of data. A statistical analysis indicates that the signal from the first two nights is robust, but we find no compelling explanation for its absence in the final night. The latter suffers from stronger noise residuals and greater instrumental instability than the first two nights, but these cannot fully account for the missing signal. It is possible that the integrated dayside emission from 51 Peg b is instead strongly affected by weather. However, more data are required before we can claim any time variability in the planet's atmosphere.

Download/Website: `http://arxiv.org/abs/1302.6242`

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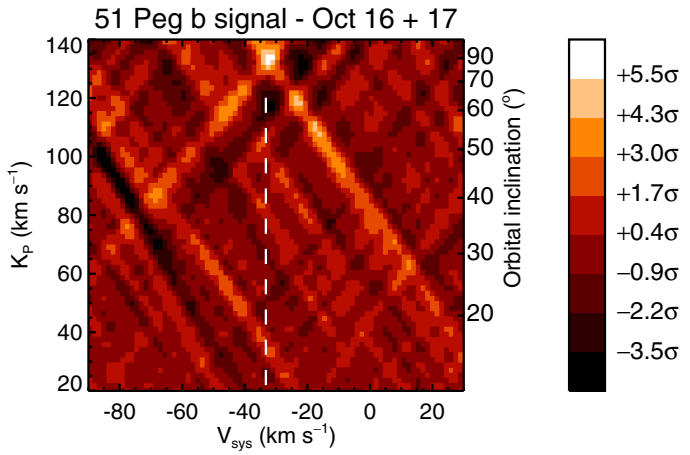

Figure 1: (Brogi et al.) Combined CO+H_2O absorption signal from the dayside spectrum of 51 Pegasi b, obtained by cross-correlating our high-resolution spectra with a model for the planet atmosphere. The signal (6σ of significance), peaks at the systemic velocity of 51 Pegasi ($V_{\rm sys}$ = -33.2 km s^{-1}), and at a planet maximum radial velocity of $K_{\rm P} \sim 134$ km s^{-1}. When combined with the already-known stellar radial velocity, this implies that 51 Pegasi b is almost transiting.

The Homogeneous Study of Transiting Systems (HoSTS) I. The Pilot Study of WASP-13

Y. Gómez Maqueo Chew[1,2,3*,4], *F. Faedi*[2,3*], *P. A. Cargile*[1], *A. P. Doyle*[5], *L. Ghezzi*[6,7], *S. Sousa*[8], *S. C. C. Barros*[9], *L. H. Hebb*[1], *K. Cunha*[6,10], *S. C. Schuler*[11], *V. V. Smith*[11,6], *A. Collier Cameron*[12], *D. Pollacco*[2,3*], *N. C. Santos*[8], *B. Smalley*[5], *K. G. Stassun*[1,13]

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The Astrophysical Journal, in press (arXiv:1302.6115)

We present the fundamental stellar and planetary properties of the transiting planetary system WASP-13 within the framework of the Homogeneous Study of Transiting Systems (HoSTS). HoSTS aims to derive the fundamental stellar ($T_{\rm eff}$, [Fe/H], $M_\star$, $R_\star$), and planetary ($M_{\rm pl}$, $R_{\rm pl}$, $T_{\rm eq}$) physical properties of known transiting planets using a consistent methodology and homogeneous high-quality dataset. Four spectral analysis techniques are independently applied to a Keck+HIRES spectrum of WASP-13 considering two distinct cases: unconstrained parameters, and constrained $\log g$ from transit light curves. We check the derived stellar temperature against that from a different temperature diagnostic based on an INT+IDS H_α spectrum. The four unconstrained analyses render results that are in good agreement, and provide an improvement of 50% in the precision of $T_{\rm eff}$, and of 85% in [Fe/H] with respect to the WASP-13 discovery paper. The planetary parameters are then derived via the Monte-Carlo-Markov-Chain modeling of the radial velocity and light curves, in iteration with stellar evolutionary models to derive realistic uncertainties. WASP-13 (1.187 ± 0.065 $M_\odot$; 1.574 ± 0.048 $R_\odot$) hosts a Saturn-mass, transiting planet (0.500 ± 0.037 $M_{\rm Jup}$; 1.407 ± 0.052 $R_{\rm Jup}$), and is at the end of its main-sequence lifetime (4-5.5 Gyr). Our analysis of WASP-13 showcases that both a detailed stellar characterization, and transit modeling are necessary to well determine the fundamental properties of planetary systems, which are paramount in identifying and determining empirical relationships between transiting planets and their hosts.

Download/Website: `http://arxiv.org/abs/1302.6115`

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Figure 2 (opposite): (Gómez Maqueo Chew et al.) *Top panel:* $R_{\rm pl}$ versus [Fe/H] for the bulk of the HoSTS sample taken from *exoplanets.org* (2012 Nov 19), and complemented with the literature. A linear regression to the data gives a correlation coefficient of -0.24, which supports the previously observed trend (e.g., Laughlin et al. 2011; Enoch et al. 2012). WASP-13 is marked by the filled circles with the shaded uncertainty areas: the grey box is for the [Fe/H] from Skillen et al. (2009), and the $\rho_\star$ from Barros et al. (2012), and the fuchsia oval represents the properties derived in this paper. The uncertainties of the other data points are given by the grey crosses. *Lower panel:* We show the trend between $R_{\rm pl}$, stellar [Fe/H], and the planetary $T_{\rm eq}$ (dependent on the stellar irradiation) for the HoSTS targets with planets in the Saturn-mass range ($0.1 \leq M_{\rm pl} \leq 0.5$ $M_{\rm Jup}$). Although the two WASP-13 points overlap, the errors on the metallicity are significantly smaller, showing the potential of the HoSTS project, by tightening the constraints rendered by the known transiting planets, including the identification of any systematics, and assess the validity of the observed trends.

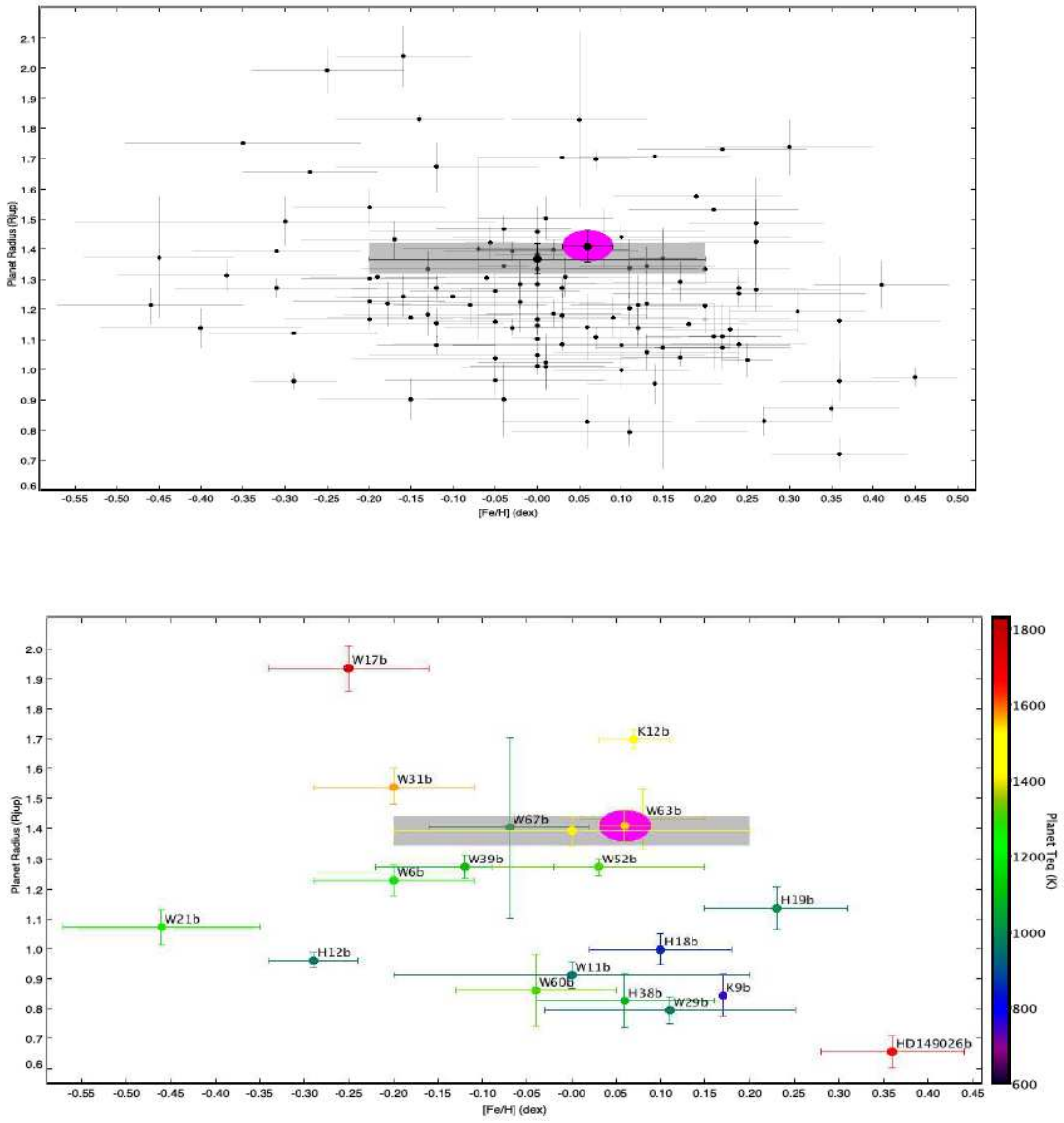
Planet Radius (Rjup)
[Fe/H] (dex)
W17b
K12b
W31b
W63b
W67b
W39b
W52b
W6b
H19b
W21b
H18b
H12b
W11b
W60b
H38b
K9b
W29b
HD149026b
Planet Teq (K)

Figure 2:

SOPHIE velocimetry of Kepler transit candidates. VIII. KOI-205 b: a brown-dwarf companion to a K-type dwarf.

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

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Astronomy & Astrophysics, in press (arXiv:1302.2628)

We report the discovery of a transiting brown dwarf companion to KOI-205, a K0 main-sequence star, in a 11.720125-day period orbit. The transits were detected by the *Kepler* space telescope, and the reflex motion of the star was measured using radial velocity observations obtained with the SOPHIE spectrograph. The atmospheric parameters of the host stars were determined from the analysis of high-resolution, high signal-to-noise ratio ES-PaDOns spectra obtained for this purpose. Together with spectrophotometric measurements recovered from the literature, these spectra indicate that the star is a mildly metallic K0 dwarf with $T_{\rm eff}$ 5237 ± 60 K. The mass of the companion is 39.9 ± 1.0 $M_{\rm Jup}$ and its radius is 0.81 ± 0.02 $R_{\rm Jup}$, in agreement with current theoretical predictions. This is the first time a *bona fide* brown dwarf companion is detected in orbit around a star of this type. The formation and orbital evolution of brown dwarf companions is briefly discussed in the light of this new discovery.

Download/Website: `http://arxiv.org/abs/1302.2628`

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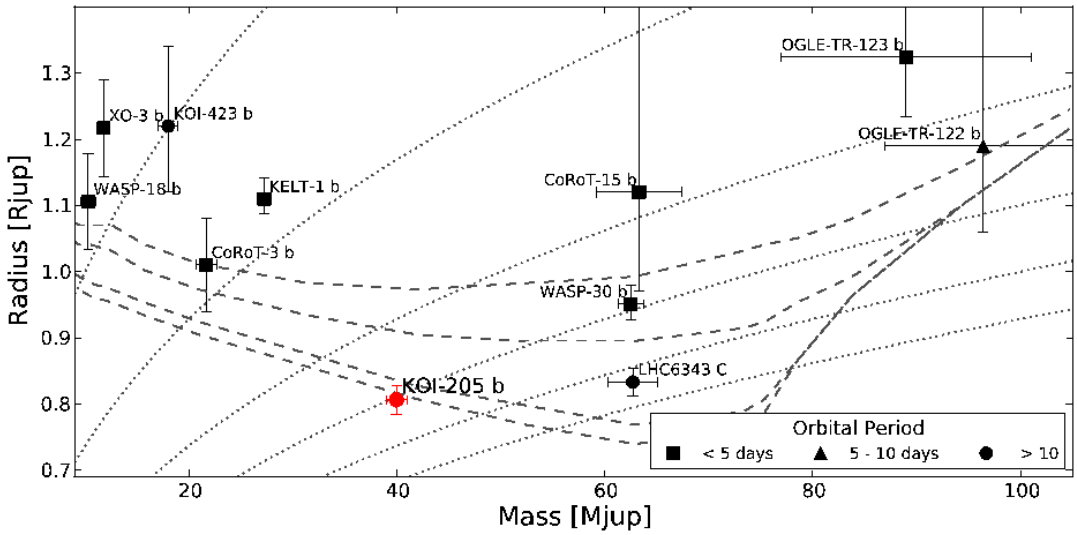

Figure 3: (Díaz et al.) Mass radius diagram including transiting companions more massive than 10 $M_{\rm Jup}$. The dashed curves are the Baraffe et al. (2003) isochrones for (from top to bottom) 0.5, 1, 5, and 10 gigayears. The dotted lines are the isodensity curves for 10, 25, 50, 75, 100, and 125 times the mean density of Jupiter.

Spectral features of Earth-like planets and their detectability at different orbital distances around F, G, and K-type stars

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Astronomy & Astrophysics, accepted for publication (arXiv:1302.5516)

Context: In recent years, more and more transiting terrestrial extrasolar planets have been found. Spectroscopy already yielded the detection of molecular absorption bands in the atmospheres of Jupiter and Neptune-sized exoplanets. Detecting spectral features in the atmosphere of terrestrial planets is the next great challenge for exoplanet characterization.
Aims: We investigate the spectral appearance of Earth-like exoplanets in the habitable zone of different main sequence (F, G and K-type) stars at different orbital distances. We furthermore discuss for which of these scenarios biomarker absorption bands and related compounds may be detected during primary or secondary transit with near-future telescopes and instruments.
Methods: Atmospheric profiles from a 1D cloud-free atmospheric climate-photochemistry model were used to compute primary and secondary eclipse infrared spectra. The spectra are analyzed taking into account different filter bandpasses of two photometric instruments planned to be mounted to the James Webb Space Telescope (JWST). We analyze in which filters and for which scenarios molecular absorption bands are detectable when using the space-borne JWST or the ground-based telescope E-ELT (European Extremely Large Telescope).
Results: Absorption bands of carbon dioxide (CO_2), water (H_2O) , methane (CH_4) and ozone (O_3) are clearly visible in both high-resolution spectra as well as in the filters of photometric instruments. However, only during primary eclipse absorption bands of CO_2, H_2O and O_3 are detectable for all scenarios when using photometric instruments and an E-ELT-like telescope setup. CH_4 is only detectable at the outer HZ of the K-type star since here the atmospheric modeling results in very high abundances. Since the detectable CO_2 and H_2O absorption bands overlap, separate bands need to be observed to prove their existence in the planetary atmosphere. In order to detect H_2O in a separate band, a S/N ratio of S/N$>$ 7 needs to be achieved for E-ELT observations, e.g. by co-adding at least 10 transit observations. Using a space-borne telescope like the JWST enables the detection of CO_2 at 4.3 μm, which is not possible for ground-based observations due to the Earth's atmospheric absorption. Hence combining observations of space-borne and ground-based telescopes might allow to detect the presence of the biomarker molecule O_3 and the related compounds H_2O and CO_2 in a planetary atmosphere. Other absorption bands using the JWST can only be detected for much higher S/N ratios, which is not achievable by just co-adding transit observations since this would be far beyond the planned mission time of JWST.

Download/Website: `http://arxiv.org/abs/1302.5516`

Contact: `pascal.hedelt@dlr.de`

Ionisation in atmospheres of Brown Dwarfs and extrasolar planets III. Breakdown conditions for mineral clouds

Ch. Helling[1], *M. Jardine*[1], *C. Stark*[1], *D. Diver*[2]
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[2] University of Glasgow, UK

The Astrophysical Journal, in press, (arXiv:1301.7586)

Electric discharges were detected directly in the cloudy atmospheres of Earth, Jupiter and Saturn, are debatable for Venus, and indirectly inferred for Neptune and Uranus in our solar system. Sprites (and other types of transient luminous events) have been detected only on Earth, and are theoretically predicted for Jupiter, Saturn and Venus. Cloud formation is a common phenomenon in ultra-cool atmospheres such as in Brown Dwarf and extrasolar planetary atmospheres. Cloud particles can be expected to carry considerable charges which may trigger discharge events via small-scale processes between individual cloud particles (intra-cloud discharges) or large-scale processes between clouds (inter-cloud discharges). We investigate electrostatic breakdown characteristics, like critical field strengths and critical charge densities per surface, to demonstrate under which conditions mineral clouds undergo electric discharge events which may trigger or be responsible for sporadic X-ray emission. We apply results from our kinetic dust cloud formation model that is part of the Drift-Phoenix model atmosphere simulations. We present a first investigation of the dependence of the breakdown conditions in Brown Dwarf and giant gas exoplanets on the local gas-phase chemistry, the effective temperature and primordial gas-phase metallicity. Our results suggest that different intra-cloud discharge processes dominate at different heights inside mineral clouds: local coronal (point discharges) and small-scale sparks at the bottom region of the cloud where the gas density is high, and flow discharges and large-scale sparks near, and maybe above, the cloud top. The comparison of the thermal degree of ionisation and the number density of cloud particles allows us to suggest the efficiency with which discharges will occur in planetary atmospheres.

Download/Website: `www.leap2010.eu --> results`

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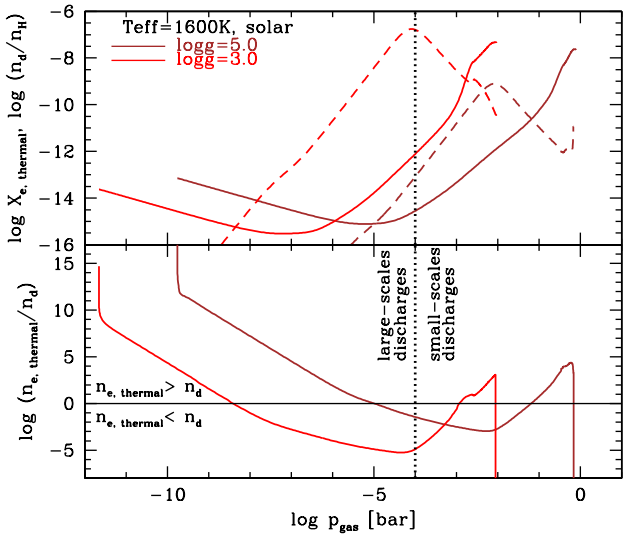

Figure 4: (Helling et al.) The efficiency of discharges in planetary atmospheres with mineral clouds. Top: Degree of thermal gas ionization (solid lines), and the dust number density per hydrogen (dashed lines), for a Brown Dwarf and a giant gas planet atmosphere. Bottom: The ratio of the number of thermal electrons to the number of cloud particles provides a measure of the efficiency with which a streamer may be initiated in a mineral cloud. Two different regimes appear: above the black line - electron dominated, hence more than one electron is available per grain pair, below the black line - dust dominated, hence less than one electron is available per grain pair. The dotted vertical lines distinguished the cloud regimes of potential large-scale cloud discharges and small-scale, inter-grain discharges.

On the dynamical stability of the proposed planetary system orbiting NSVS 14256825

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Monthly Notices of the Royal Astronomical Society, in press (arXiv:1302.4137)

We present a detailed dynamical analysis of the orbital stability of the two circumbinary planets recently proposed to orbit the evolved eclipsing binary star system NSVS 14256825. As is the case for other recently proposed circumbinary planetary systems detected through the timing of mutual eclipses between the central binary stars, the proposed planets do not stand up to dynamical scrutiny. The proposed orbits for the two planets are extremely unstable on timescales of less than a thousand years, regardless of the mutual inclination between the planetary orbits. For the scenario where the planetary orbits are coplanar, a small region of moderate stability was observed, featuring orbits that were somewhat protected from destabilisation by the influence of mutual 2:1 mean-motion resonance between the orbits of the planets. Even in this stable region, however, the systems tested typically only survived on timescales of order 1 million years, far shorter than the age of the system. Our results suggest that, if there are planets in the NSVS 14256825 system, they must move on orbits dramatically different to those proposed in the discovery work. More observations are clearly critically required in order to constrain the nature of the suggested orbital bodies.

Download/Website: `http://adsabs.harvard.edu/abs/2013arXiv1302.4137W`

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Dynamical Constraints on Multi-Planet Exoplanetary Systems

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Proceedings of the 12th annual Australian Space Science Conference, in press (arXiv:1302.5247)

[*] refereed journal As a direct result of ongoing efforts to detect more exoplanetary systems, an ever- increasing number of multiple-planet systems are being announced. But how many of these systems are truly what they seem? In many cases, such systems are announced solely on the basis of orbital fits to observational data, and no attempt is made to see whether the proposed orbits are actually dynamically feasible. As a result, it is certain that planetary systems are being announced that involve planets moving on orbits that would be dynamically unstable on timescales of just a few hundred years.

Here, we present the results of dynamical simulations that investigate the orbital stability and evolution of a number of recently discovered exoplanetary systems. These simulations have enabled us to create highly detailed dynamical maps of those systems, allowing us to better constrain the orbits of the planets contained therein. In some cases, our results have even led to the very existence of the planets themselves being called into question.

Download/Website: `http://adsabs.harvard.edu/abs/2013arXiv1302.5247H`

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Hint of 150 MHz radio emission from the Neptune-mass extrasolar transiting planet HAT-P-11b

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Astronomy & Astrophysics, in press (arXiv:1302.4612)

Since the radio-frequency emission from planets is expected to be strongly influenced by their interaction with the magnetic field and corona of the host star, the physics of this process can be effectively constrained by making sensitive measurements of the planetary radio emission. Up to now, however, numerous searches for radio emission from extrasolar planets at radio wavelengths have only yielded negative results. Here we report deep radio observations of the nearby Neptune-mass extrasolar transiting planet HAT-P-11b at 150 MHz, using the Giant Meterwave Radio Telescope (GMRT). On July 16, 2009, we detected a 3σ emission whose light curve is consistent with an eclipse when the planet passed behind the star. This emission is at a position 14" from the transiting exoplanet's coordinates; thus, with a synthesized beam of FWHM$\sim$16", the position uncertainty of this weak radio signal encompasses the location of HAT-P-11. We estimate a 5% false positive probability that the observed radio light curve mimics the planet's eclipse light curve. If the faint signature is indeed a radio eclipse event associated with the planet, then its flux would be 3.87 mJy$\pm$1.29 mJy at 150 MHz. However, our equally sensitive repeat observations of the system on November 17, 2010 did not detect a significant signal in the radio light curve near the same position. This lack of confirmation leaves us with the possibility of either a variable planetary emission, or a chance occurrence of a false positive signal in our first observation. Deeper observations are required to confirm this hint of 150 MHz radio emission from HAT-P-11b.

Download/Website: `http://arxiv.org/abs/1302.4612`

Contact: `lecaveli@iap.fr`

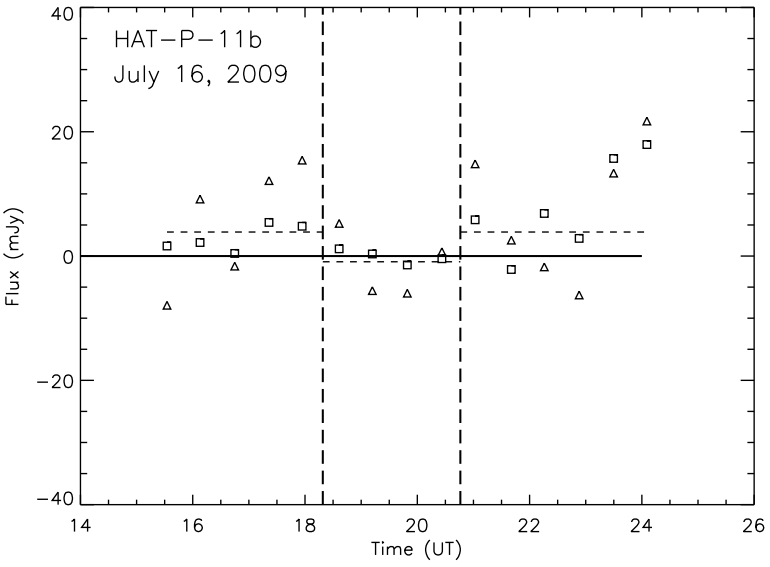

Figure 5: (Lecavalier des Etangs et al.) Time series of the 150 MHz flux density measured on July 16, 2009, in the direction of the radio source near HAT-P-11. The measurements have been rebinned to 36 minutes. Triangles and squares correspond to the RR and LL polarizations, respectively. The two vertical long-dashed lines indicate the beginning and the end of the planet's eclipse behind the host star. The dashed horizontal lines show the box-shaped eclipse light curve fitted to the data points.

Gaps in the HD169142 protoplanetary disk revealed by polarimetric imaging: Signs of ongoing planet formation?

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Astrophysical Journal Letters, accepted for publication (arXiv:1302.3029)

We present H-band VLT/NACO polarized light images of the Herbig Ae/Be star HD169142 probing its protoplanetary disk as close as $\sim$0.1″ to the star. Our images trace the face-on disk out to $\sim$1.7″ ($\sim$250 AU) and reveal distinct sub-structures for the first time: 1) the inner disk ($<$20 AU) appears to be depleted in scattering dust grains; 2) an unresolved disk rim is imaged at $\sim$25 AU; 3) an annular gap extends from $\sim$40 – 70 AU; 4) local brightness asymmetries are found on opposite sides of the annular gap. We discuss different explanations for the observed morphology among which ongoing planet formation is a tempting – but yet to be proven – one. Outside of $\sim$85 AU the surface brightness drops off roughly $\propto r^{-3.3}$, but describing the disk regions between 85–120 AU / 120–250 AU separately with power-laws $\propto r^{-2.6}$/$\propto r^{-3.9}$ provides a better fit hinting towards another discontinuity in the disk surface. The flux ratio between the disk integrated polarized light and the central star is $\sim 4.1 \cdot 10^{-3}$. Finally, combining our results with those from the literature, $\sim$40% of the scattered light in the H-band appears to be polarized. Our results emphasize that HD169142 is an interesting system for future planet formation or disk evolution studies.

Download/Website: `http://xxx.lanl.gov/abs/1302.3029`

Contact: `sascha.quanz@astro.phys.ethz.ch`

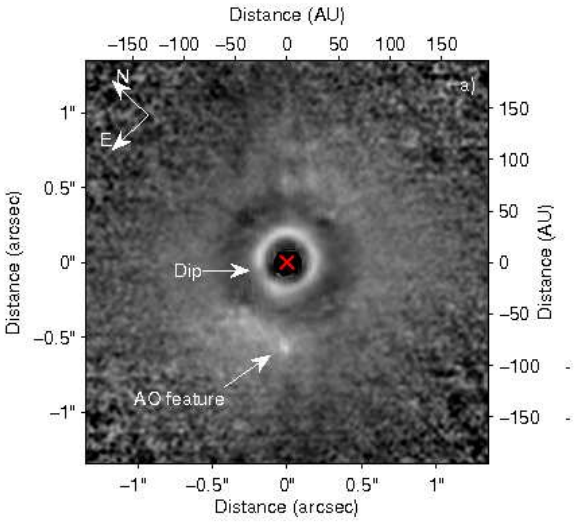

Figure 6: (Quanz et al.) NACO/PDI observations of HD169142 in the H band. Final polarized light image scaled with r^2 to compensate for the decrease in stellar flux (image shown in a linear stretch). The position of the central star is indicated by the red cross. Saturated pixels in the central regions have been masked out. Our data reveal a bright inner ring, a large gap and a smooth outer disk in polarized light. A brightness dip in the ring and a residual AO feature are indicated by arrows.

A young protoplanet candidate embedded in the circumstellar disk of HD100546

S.P. Quanz[1]*, A. Amara*[1]*, M.R. Meyer*[1]*, M.A. Kenworthy*[2]*, M. Kasper*[3]*, and J.H. Girard*[4]

[1] Institute for Astronomy, ETH Zurich, Wolfgang-Pauli-Strasse 27, 8093 Zurich, Switzerland
[2] Sterrewacht Leiden, P.O. Box 9513, Niels Bohrweg 2, 2300 RA Leiden, The Netherlands
[3] European Southern Observatory, Karl Schwarzschild Strasse, 2, 85748 Garching bei München, Germany
[4] European Southern Observatory, Alonso de Córdova 3107, Vitacura, Cassilla 19001, Santiago, Chile

Astrophysical Journal Letters, in press (arXiv:1302.7122)

We present high-contrast observations of the circumstellar environment of the Herbig Ae/Be star HD100546. The final 3.8 μm image reveals an emission source at a projected separation of $0.48'' \pm 0.04''$ (corresponding to $\sim 47 \pm 4$ AU) at a position angle of $8.9^\circ \pm 0.9^\circ$. The emission appears slightly extended with a point source component with an apparent magnitude of 13.2 ± 0.4 mag. The position of the source coincides with a local deficit in polarization fraction in near-infrared polarimetric imaging data, which probes the surface of the well-studied circumstellar disk of HD100546. This suggests a possible physical link between the emission source and the disk. Assuming a disk inclination of $\sim 47^\circ$ the de-projected separation of the object is ~ 68 AU. Assessing the likelihood of various scenarios we favor an interpretation of the available high-contrast data with a planet in the process of forming. Follow-up observations in the coming years can easily distinguish between the different possible scenarios empirically. If confirmed, HD100546 "b" would be a unique laboratory to study the formation process of a new planetary system, with one giant planet currently forming in the disk and a second planet possibly orbiting in the disk gap at smaller separations.

Download/Website: `http://arxiv.org/abs/1302.7122`

Contact: `sascha.quanz@astro.phys.ethz.ch`

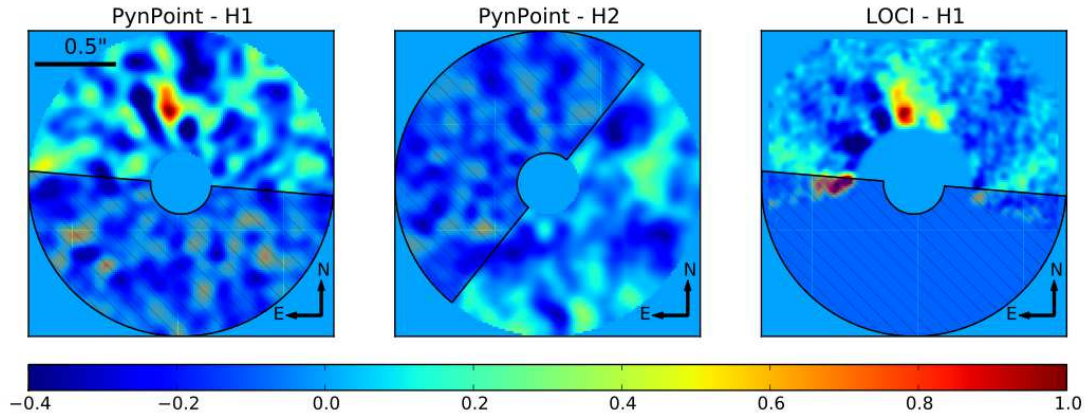

Figure 7: (Quanz et al.) NACO/APP L′ images of the circumstellar environment of HD100546. From left to right: Final PYNPOINT images of hemisphere 1 and hemisphere 2 and final LOCI image of hemisphere 1. An emission source – the protoplanet candidate – is clearly detected in left and right panel. The shaded area indicates the region that was only covered by the low sensitivity hemisphere of the APP. The images are scaled with respect to their peak flux.

Ice condensation as a planet formation mechanism

K. Ros, A. Johansen
Lund Observatory, Department of Astronomy and Theoretical Physics, Lund University, Box 43, 221 00 Lund, Sweden

Astronomy & Astrophysics, accepted for publication (arXiv:1302.3755)

We show that condensation is an efficient particle growth mechanism, leading to growth beyond decimeter-sized pebbles close to an ice line in protoplanetary discs. As coagulation of dust particles is frustrated by bouncing and fragmentation, condensation could be a complementary, or even dominant, growth mode in the early stages of planet formation. Ice particles diffuse across the ice line and sublimate, and vapour diffusing back across the ice line recondenses onto already existing particles, causing them to grow. We develop a numerical model of the dynamical behaviour of ice particles close to the water ice line, approximately 3 AU from the host star. Particles move with the turbulent gas, modelled as a random walk. They also sediment towards the midplane and drift radially towards the central star. Condensation and sublimation are calculated using a Monte Carlo approach. Our results indicate that, with a turbulent α-value of 0.01, growth from millimeter to at least decimeter-sized pebbles is possible on a time scale of 1000 years. We find that particle growth is dominated by ice and vapour transport across the radial ice line, with growth due to transport across the atmospheric ice line being negligible. Ice particles mix outwards by turbulent diffusion, leading to net growth across the entire cold region. The resulting particles are large enough to be sensitive to concentration by streaming instabilities, and in pressure bumps and vortices, which can cause further growth into planetesimals. In our model, particles are considered to be homogeneous ice particles. Taking into account the more realistic composition of ice condensed onto rocky ice nuclei might affect the growth time scales, by release of refractory ice nuclei after sublimation. We also ignore sticking and fragmentation in particle collisions. These effects will be the subject of future investigations.

Download/Website: `http://arxiv.org/abs/1302.3755`

Contact: `katrin.ros@astro.lu.se`

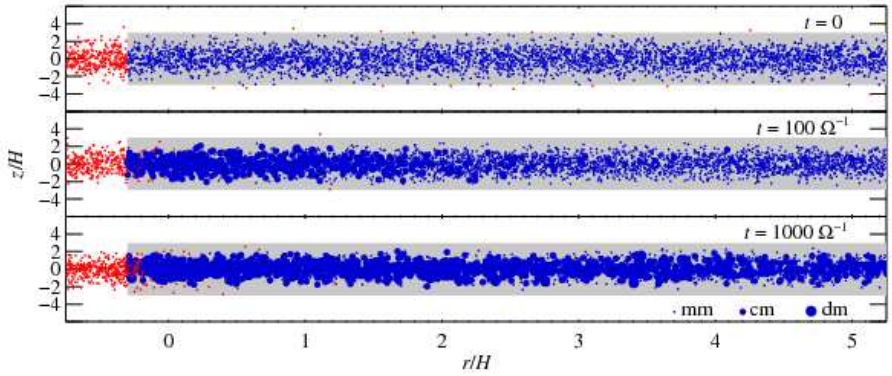

Figure 8: (Ros & Johansen) State of a simulation with both the radial and the atmospheric ice line included, for $t = 0,\ 100 \text{ and } 1000\ \Omega^{-1}$, from top to bottom. The grey area represents the condensation zone, and ice and vapour is shown in blue and red, respectively. The sizes of the blue dots are proportional to the size of the ice particles and the number of particles shown is inversely scaled with size for visibility. The turbulent α-value is 10^{-2}.

3 Jobs and Positions

Postdoctoral Research Assistant

Ignasi Ribas
Institute for Space Studies of Catalonia (IEEC-CSIC) Campus Universitat Autònoma de Barcelona Bellaterra

Institute for Space Studies of Catalonia, April 1, 2013

Applications are invited for a Postdoctoral Research Assistant position to work with Dr. Ignasi Ribas at the Institute of Space Studies of Catalonia (IEEC-CSIC) in Barcelona. The successful candidate will participate in a project aimed at understanding the impact of stellar activity on the detection and characterization of exoplanets. The project will employ both observations and modeling techniques to investigate all the different aspects of stellar magnetic activity and their impact on both precise radial velocities and photometry. The results will have direct application to the CARMENES instrument and the EChO mission in which the team is involved. The proposed work will benefit from direct access to a variety of telescopes and instruments in the ESO sites, Canary Islands (GTC, HARPS-N) and Calar Alto, as well as to data from ESA missions.

The position will be initially a one-year appointment but can be extended up to a total of 3 years depending on the availability of funds. A starting date in May – June 2013 is foreseen. A PhD in Astrophysics or a related field is required. Research experience in the field of stellar activity, precise photometry and spectroscopy, as well as good computational skills will be valued. Applications should include a CV, a publication list, a summary of previous and current research (max 3 pages) and be submitted electronically in PDF format to I. Ribas at iribas@ieec.cat. Applicants should also arrange for two letters of reference sent by the referees directly to the same contact. Review of applications will begin in April 1, 2013 and will continue until the position is filled.

Contact: `iribas@ieec.cat`

Postdoctoral Research Position in Exoplanets and Transit Surveys

Joshua Pepper
Lehigh University, 27 Memorial Drive West, Bethlehem, PA 18015 USA

Lehigh University, March 15, 2013

Applications are invited for a postdoctoral researcher to work with Professor Joshua Pepper on exoplanets and transit surveys. The position will principally involve identification and characterization of transiting exoplanets from the KELT transit survey, and will also include work on variable stars, and other transient phenomena. The successful candidate will participate in many aspects of the project, including: identifying transit candidates, measuring the properties of the discovered systems, data management, software development, follow-up observations (photometry and spectroscopy), and interpretation of the data. The candidate will collaborate extensively with current members of the KELT team at Ohio State, Vanderbilt, and other institutions, and will have the opportunity to pursue their own research projects as well.

The candidate should have extensive experience with the Linux work environment and Linux-based development in C/C++ or Python with a focus on algorithms and statistics, and a background in areas such as exoplanets, time-series photometry, data reduction, and/or astronomical surveys. We especially seek applicants with experience working with large photometric datasets and a willingness to work with and assist in advising graduate and undergraduate students.

The applicant must have a PhD in astronomy, physics or a related field by the date of appointment. The appointment is for three years, renewed annually subject to performance, and can begin as early as June 2013. Salary and benefits

are competitive, and will include funding for travel, computing, and publications.

Applications must include 1) a curriculum vitae including list of publications, 2) a statement of the applicant's past and current research experience, up to 3 pages long, and 3) three letters of recommendation. The CV and research statement should be in PDF format, and materials should be sent directly to jap612@lehigh.edu, by March 15, 2013. Early expressions of interest and inquiries are welcome.

Lehigh University is an affirmative action/equal opportunity employer and does not discriminate on the basis of age, color, disability, gender, gender identity, genetic information, marital status, national or ethnic origin, race, religion, sexual orientation, or veteran status.

Download/Website: `http://jobregister.aas.org/job_view?JobID=44517`

Contact: `jap612@lehigh.edu`

Postdoctoral Researcher in Brown Dwarf and Exoplanet Atmospheres

Daniel Apai

Steward Observatory and Department of Astronomy, The University of Arizona & Lunar and Planetary Laboratory and Department of Planetary Sciences, The University of Arizona

Tucson, AZ, Summer/Fall 2013

Applications are invited for a postdoctoral position in the field of exoplanet and brown dwarf atmosphere studies. The successful applicant will work with Prof. Daniel Apai to characterize ultracool atmospheres as a member of the Spitzer Exploration Science program "Extrasolar Storms: The Physics and Chemistry of Evolving Cloud Structures in Brown Dwarf Atmospheres." This project uses coordinated, time-resolved Spitzer photometry and HST near-infrared spectroscopy to explore the evolution of cloud features and storms on cool brown dwarfs. Connecting projects on phase mapping of rotating extrasolar planets are also foreseen. Prof. Apai's group is involved in studies of protoplanetary disks, exoplanet searches, and the characterization of ultracool atmospheres.

The position will begin in Summer/Fall 2013. Facilities accessible at the University of Arizona include the 2×8.4m Large Binocular Telescope, the 6.5m MMT, the twin 6.5m Magellan telescopes, the 10m Heinrich-Hertz Submillimeter Telescope, the Kitt Peak 12m mm-wave Telescope, the 2.3m Bok and 1.5m Kuiper telescopes, and the Vatican Advanced Technology Telescope.

The successful applicant must have completed the requirements for the Ph.D. degree prior to arrival. Expertise in infrared spectroscopy, HST and Spitzer data reduction, high-contrast imaging or planetary transits, or planetary atmospheres is an advantage. The initial appointment is for two years, with a possible extension for a third year, pending funding and satisfactory performance. Applicants should submit a letter of interest, curriculum vitae, list of publications, and a brief statement of relevant research experience online at: www.hr.arizona.edu, with reference to job 51476. Review of applications is ongoing and continue until the position is filled; applications received by March 22, 2013 are guaranteed full consideration.

Letters of reference will be requested from top-ranked applicants only.

Contact: `apai@as.arizona.edu`

4 Conference announcements

High angular resolution for stellar astrophysics Stellar activity, surface dynamics, fundamental parameters, exoplanetary systems, pulsations

A. Chiavassa, F. Millour, L. Bigot, O. Chesneau
Observatoire de la Côte d'Azur, Lagrange, Nice, France

Barcelonnette, Côte d'Azur, France, 9th – 21st September 2013

Interferometry has reached a new era with the advent of large and multi-telescope arrays. Interferometric facilities are becoming more and more open to non-specialist astronomers, and the Very Large Telescope Interferometer (VLTI) is a good example of a fully open interferometric facility. We are organizing a summer school to train astrophysicists to use the VTLI and other facilities with the current generation of instruments. The aim of the school is to offer Ph.D. students, post-doctoral and permanent researchers an introduction to the technique of long-baseline optical/infrared interferometry and data reduction in astrophysics, namely, stellar physics including the hot topics of stellar activity, evolution, hydrodynamics, planet-hosting stars, determination of fundamental parameters, circumstellar envelopes, young stellar objects, as well as the role of binaries. The school will be held in the heart of the Alpine mountains in Barcelonnette, Côte d'Azur, France, from 9th-21st September 2013. Barcelonnette is a typical alpine town, located in the heart of the Mercantour French National Park, with many possibilities of activities like hiking or wildlife discovery. The school is also located a stone's throw from the Hypertelescope prototype, a novel type of stellar interferometer currently under construction, and a visit is foreseen during the school.

IMPORTANT DATES
February 1st, 2013 : First announcement and web site
February 15th, 2013 : Early registration opened
May 31st, 2013 : Deadline for financial support
June 30th, 2013 : Deadline for early registration and payment (100 euro)
July 31th, 2013 : Deadline for late registration and payment (150 euro)
September 9th, 2013 : The VLTI-school starts

Download/Website: `http://vltischool.sciencesconf.org`

Contact: `vltischool@sciencesconf.org`

Characterising exoplanets: detection, formation, interiors, atmospheres and habitability

Peter L. Read
Atmospheric, Oceanic & Planetary Physics, Clarendon Laboratory, Parks Road, Oxford, OX1 3PU, UK

The Royal Society, London, 11 – 12 March 2013

DIscussion Meeting at the Royal Society on "Characterising exoplanets: detection, formation, interiors, atmospheres and habitability", 11 – 12 March 2013 in London with an international programme of speakers covering a wide range of topics, from exoplanet detection through their formation and the characterization and habitability of their atmospheres. Registration is still open for attendees, though the poster abstract deadline has now passed.

Download/Website: `http://royalsociety.org/events/2013/exoplanets/`

Contact: `p.read1@physics.ox.ac.uk`

AGU Chapman Conference – Crossing the Boundaries in Planetary Atmospheres: From Earth to Exoplanets

Peter L. Read
Atmospheric, Oceanic & Planetary Physics, Clarendon Laboratory, Parks Road, Oxford, OX1 3PU, UK

Annapolis, MD, USA, June 24 – 28, 2013

This will be a working meeting that emphasizes developing a common language, exchange of ideas, and planning for future collaborations among the Earth, planetary and exoplanetary science communities. Among the topics we plan to explore are:

1. What fundamental processes govern ALL atmospheres? Can they be applied uniformly in generalized dynamic, thermodynamic, and chemistry models, including non-local thermodynamic equilibrium (non-LTE) effects? What limitations of our current theories and models of Earth climate compromise their application to more extreme climates of the past and future, and to other planets?

2. Can planetary atmospheres be broken into classes or taxonomies with commonalities in composition, structure, or dynamics?

3. How can insights from one field be adapted or extended to improve our knowledge in another field?

4. Are there community-specific observational and analysis techniques that can be applied to the other disciplines?

Contributed abstracts are solicited on the following topics, crossing the Earth, planetary, and exoplanet atmospheres disciplines. Preference for contributed talks will be given to those that are of a cross-disciplinary nature.
* Atmospheric model development and applications
* Atmospheric theory
* Data acquisition, assimilation, and analysis
* Observational techniques and needs, ground and space-based
* Laboratory techniques and needs

on behalf of the organizing committee: Amy Simon-Miller, Linda Sohl, Tony Del Genio, Imke de Pater, Nancy Chanover, Aki Roberge, David Crisp, Athena Coustenis, Lisa Kaltenegger & Peter Read

Download/Website: `http://chapman.agu.org/planetaryatmospheres/`

Contact: `p.read1@physics.ox.ac.uk`

2013 Sagan Summer Workshop: Imaging Planets and Disks

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

Pasadena, CA, July 29 – August 2, 2013

Registration and the application for financial aid are now available for the 2013 Sagan Exoplanet Summer Workshop on “Imaging Planets and Disks” hosted by the NASA Exoplanet Science Institute (NExScI). The workshop will take place on the Caltech campus July 29 - August 2, 2013. The workshop is intended for graduate students and postdocs, however all interested parties are welcome to attend.

The 2013 workshop will explore current techniques and technology used to detect exoplanets and debris disks, as well as the underlying science driving the modeling of exoplanetary atmospheres and disk structure. A number of

ground-based surveys are presently underway using advanced coronagraphs and Extreme Adaptive Optics on 5-10 m telescopes while new algorithms are being used to dig deeper in space-based datasets. Leaders in the field will summarize the current state of the art in science, hardware, and software. Prospects for future space instruments will also be discussed. Attendees will participate in hands-on exercises to gain experience working with imaging data, astrophysical models, and instrument design. Attendees will also have the opportunity to present their own work through short presentations (research POPs) and posters.

Important Dates

- February 1: On-line Registration available and Financial Support Application period open
- March 1: Financial Support applications and supporting letter of recommendation due
- March 25: Financial Support decisions announced via email
- April 1: POP/Poster submission page on-line
- June 14: Early on-line registration ends
- June 28: POP/Poster Submission deadline
- July 12: On-line registration closed and Hotel Registration deadline to be eligible for group rate
- July 12: Deadline for hotel reservations in room block at the Pasadena Sheraton
- July 12: Final Agenda posted
- July 28: Sagan Exoplanet Summer Workshop Opening Reception
- July 29-Aug 2: 2013 Sagan Exoplanet Summer Workshop

Download/Website: `http://nexsci.caltech.edu/workshop/2013`
Contact: `sagan_workshop@ipac.caltech.edu`

The Search for Life Beyond the Solar System: Exoplanets, Biosignatures & Instruments

Paul Gabor[1]*, Dániel Apai*[2]
[1] Vatican Observatory Research Group, Dpt of Astronomy, University of Arizona, Tucson AZ 85721-0065
[2] Department of Astronomy and Department of Planetary Sciences, University of Arizona, Tucson AZ 85721-0065

Tucson, Arizona, March 17-21, 2014

First Announcement

Motivated by the rapidly increasing number of known earth-sized planets, the increasing range of extreme conditions in which life on Earth can persist, and the progress toward a technology that will ultimate enable the search for life on exoplanets, the Vatican Observatory and the Steward Observatory announce a major conference entitled Exoplanets, Observations & Biosignatures: The Search for Life Beyond the Solar System.

The goal of the meeting is to help the international astronomical community toward the long-term goal of finding life beyond the solar system by bringing together the communities working on the observations and modeling of extrasolar planets, the development of exoplanet-focused instrumentation, biosignatures suitable for remote sensing, and the extreme life on Earth.

Chairs: Daniel Apai & Paul Gabor

Ariel Anbar (ASU)	Chris Impey (U Arizona)	Jonathan Lunine (Cornell)
John Baross (U Wash.)	Jim Kasting (Penn State)	Daniel Rouan (Paris Obs.)
Malcolm Fridlund (ESA)	Dante Minniti (P U Chile)	Wes Traub (NASA JPL)
Thomas Henning (MPIA)	Mercedes López-Morales (CfA)	Sara Seager (MIT)
Phil Hinz (U Arizona)	Peter R. Lawson (NASA JPL)	

We anticipate about 250 participants. The program will include keynote and invited speakers, contributed talks, poster sessions and ample time for discussion.

SCIENTIFIC ORGANIZING COMMITTEE

VENUE

The event will be in the new *El Conquistador Hilton Resort* close to Tucson, next to the scenic Catalina Mountains. Tucson has an international airport and can also be reached via the major airline hub in Phoenix, AZ. Tucson is a favorite tourist destination in the spring and hosts world-class golf courses, and offers excellent hiking, cycling, rock-climbing, canyoning, and other outdoor activities. Optional social programs will include visits to the Grand Canyon, the UA's Mirror Lab, the MMT and LBT telescopes, the Biosphere 2, and the Mt Lemmon Sky Center.

ASTROBIOLOGY SCHOOL

The conference will be preceded by an independently-organized three-day school hosted at the University of Arizona's Biosphere 2. The school will allow graduate students and junior postdocs to learn from the invited/keynote speakers and additional lecturers about the key topics of the conference. This will help them to benefit fully from the multi-disciplinary program and to connect with their peers from other disciplines.

Download/Website: `http://www.ebi2014.org/`

Contact: `loc@ebi2014.org`

5 Announcements

Fizeau exchange visitors program in optical interferometry – call for applications

European Interferometry Initiative
Fizeau exchange visitors program

European Interferometry Initiative, application deadline: 15th March 2013

The Fizeau exchange visitors program in optical interferometry funds (travel and accommodation) visits of researchers to an institute of his/her choice (within the European Community) to perform collaborative work and training on one of the active topics of the European Interferometry Initiative. The visits will typically last for one month, and strengthen the network of astronomers engaged in technical, scientific and training work on optical/infrared interferometry. The program is open for all levels of astronomers (Ph.D. students to tenured staff). Applicants are strongly encouraged to seek also partial support from their home or host institutions.

The deadline for applications is March 15. Fellowships can be awarded for missions starting in May 2013.
Applications for attending the VLTI school 2013 will be considered but funding will be coordinated with the school organizers.

Further informations and application forms can be found at: www.european-interferometry.eu and vltischool.sciencesconf.org
The program is funded by OPTICON/FP7.

Looking forward to your applications,
Josef Hron & Laszlo Mosoni
(for the European Interferometry Initiative)

Download/Website: `http://www.european-interferometry.eu`

Contact: `fizeau@european-interferometry.eu`

2013B NASA Keck Call for General Observing Proposals and Special Multi-Semester Kepler Key Science Call

Dr. Dawn M. Gelino
NASA Exoplanet Science Institute

Proposals Due: March 14, 2013, 4 pm PDT

NASA is soliciting proposals to use the two 10m W. M. Keck Telescopes for the 2013B observing semester (August 2013 - January 2014). The opportunity to propose as Principal Investigators for 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.*

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.

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.

Special Multi-Semester Kepler Key Science Call:
Keck has been critical to validation and characterization of Kepler exoplanets since 2009. For the period 2013B-2015A, NASA will allocate ∼10 nights per semester for follow-up activities via competitive selection of Key Projects. This will be the only opportunity to propose for the majority of Keck follow-up time for Kepler exoplanet science.

Single-semester proposals for all Kepler-related science will continue to be accepted as part of the standard NASA Keck call.

Properties of the Kepler Key Projects are:

- Proposals must be relevant to Kepler's exoplanet goals
- Multi-semester proposals requesting between 2 and 4 semesters
- Up to a total of 40 nights with no more than ∼10 nights/semester
- Small, multi-semester proposals are also encouraged

The text of this call along with the online electronic submission page will be available on Feb. 7. The proposal process is being handled by the NASA Exoplanet Science Institute (NExScI) at Caltech and all proposals are due on 14 March 2013 at 4 pm PDT.

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

Contact: `KeckCFP@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 February 2013. If you see any that we missed, please let us know and we'll include them in the next issue.

astro-ph/1302.0006 : **Determining Reflectance Spectra of Surfaces and Clouds on Exoplanets** by *Nicolas B. Cowan, Talia E. Strait*
astro-ph/1302.0010 : **Completeness of Imaging Surveys for Eccentric Exoplanets** by *Stephen R. Kane*
astro-ph/1302.0563 : **Triple-Star Candidates Among the Kepler Binaries** by *S. Rappaport, et al.*
astro-ph/1302.0582 : **A Thermal Infrared Imaging Study of Very Low-Mass, Wide Separation Brown Dwarf Companions to Upper Scorpius Stars: Constraining Circumstellar Environments** by *Vanessa Bailey, et al.*
astro-ph/1302.0738 : **Probing the Inner Regions of Protoplanetary Disks with CO Absorption Line Spectroscopy** by *Matthew McJunkin, et al.*
astro-ph/1302.0841 : **OGLE-2011-BLG-0417: A Radial Velocity Testbed for Microlensing** by *Andrew Gould, et al.*
astro-ph/1302.0845 : **A 1.1 to 1.9 GHz SETI Survey of the Kepler Field: I. A Search for Narrow-band Emission from Select Targets** by *Andrew P. V. Siemion, et al.*

astro-ph/1302.1141 : **Infrared Transmission Spectroscopy of the Exoplanets HD209458b and XO-1b Using the Wide Field Camera-3 on the Hubble Space Telescope** by *Drake Deming, et al.*
astro-ph/1302.1160 : **The near-infrared spectral energy distribution of β Pictoris b** by *M. Bonnefoy, et al.*
astro-ph/1302.1322 : **Dynamical stability of the Gliese 581 exoplanetary system** by *Zsuzsanna Tóth, Imre Nagy*
astro-ph/1302.1403 : **Protoplanetary Disk Structure With Grain Evolution: the ANDES Model** by *V. Akimkin, et al.*
astro-ph/1302.1466 : **Stellar Magnetic Fields as a Heating Source for Extrasolar Giant Planets** by *D. Buzasi*
astro-ph/1302.1517 : **Constraining the initial entropy of directly-detected exoplanets** by *G.-D. Marleau, A. Cumming*
astro-ph/1302.1620 : **Secular Orbital Evolution of Compact Planet Systems** by *Ke Zhang, Douglas P. Hamilton, Soko Matsumura*
astro-ph/1302.1647 : **The Occurrence Rate of Small Planets around Small Stars** by *Courtney D. Dressing, David Charbonneau*
astro-ph/1302.1851 : **On the functional form of the metallicity-giant planet correlation** by *A. Mortier, et al.*
astro-ph/1302.1892 : **Formation of giant planets and brown dwarfs on wide orbits** by *Eduard I. Vorobyov*
astro-ph/1302.1934 : **Gap Opening by Extremely Low Mass Planets in a Viscous Disk** by *Paul C. Duffell, Andrew I MacFadyen*
astro-ph/1302.2045 : **Interaction between massive planets on inclined orbits and circumstellar discs** by *Meng Xiang-Gruess, John C. B. Papaloizou*
astro-ph/1302.2147 : **Catastrophic Evaporation of Rocky Planets** by *Daniel Perez-Becker, Eugene Chiang*
astro-ph/1302.2313 : **Escaping particle fluxes in the atmospheres of close-in exoplanets. ii. reduced mass loss rates and anisotropic winds** by *J.H.Guo*
astro-ph/1302.2432 : **High-temperature measurements of VUV-absorption cross sections of CO2 and their application to exoplanets** by *Olivia Venot, et al.*
astro-ph/1302.2596 : **Kepler-68: Three Planets, One With a Density Between That of Earth and Ice Giants** by *Ronald L. Gilliland, et al.*
astro-ph/1302.2622 : **Sculpting the disk around T Cha: an interferometric view** by *Johan Olofsson, et al.*
astro-ph/1302.2624 : **Fundamental Properties of Kepler Planet-Candidate Host Stars using Asteroseismology** by *Daniel Huber, et al.*
astro-ph/1302.2627 : **Convergence zones for Type I migration: an inward shift for multiple planet systems** by *Christophe Cossou, Sean Raymond, Arnaud Pierens*
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