ExoPlanet News
An Electronic Newsletter

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Contents

1 Editorial

Welcome to the twelfth edition of ExoPlanet News, an electronic newsletter reporting the latest developments and research outputs in the field of exoplanets. Sorry we did not manage to put out an edition in September, but both of the editors were away at the time, and since there were fewer announcements and papers over the (northern hemisphere) summer, we thought we would delay the next edition unitl October, and here it is.

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 . As ever, we rely on you, the subscribers of the newsletter, to send us your abstracts of recent papers, conference announcements, thesis abstracts, job adverts etc for each edition.

Please send anything relevant to exoplanet@open.ac.uk, and it will appear in the next edition which we plan to send out close to the beginning of each calendar month.
Best wishes
Andrew Norton & Glenn White
The Open University

2 Abstracts of refereed papers

Tides and the Evolution of Planetary Habitability

R. Barnes[1], *S.N. Raymond*[2,3], *B. Jackson*[1], *R. Grenberg*[1]

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Astrobiology, vol. 8, num. 3, 557 – 568 (2008)

Tides raised on a planet by the gravity of its host star can reduce the planet's orbital semi-major axis and eccentricity. This effect is only relevant for planets orbiting very close to their host stars. The habitable zones of low-mass stars are also close in, and tides can alter the orbits of planets in these locations. We calculate the tidal evolution of hypothetical terrestrial planets around low-mass stars and show that tides can evolve planets past the inner edge of the habitable zone, sometimes in less than 1 billion years. This migration requires large eccentricities (> 0.5) and low-mass stars (< 0.35 $M_\odot$). Such migration may have important implications for the evolution of the atmosphere, internal heating, and the Gaia hypothesis. Similarly, a planet that is detected interior to the habitable zone could have been habitable in the past. We consider the past habitability of the recently discovered, ~ 5 $M_\oplus$ planet, Gliese 581 c. We find that it could have been habitable for reasonable choices of orbital and physical properties as recently as 2 Gyr ago. However, when constraints derived from the additional companions are included, most parameter choices that indicate past habitability require the two inner planets of the system to have crossed their mutual 3:1 mean motion resonance. As this crossing would likely have resulted in resonance capture, which is not observed, we conclude that Gl 581 c was probably never habitable.

Download/Website: `http://www.lpl.arizona.edu/ rory/publications`

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TiO and VO broad band absorption features in the atmosphere of HD 209458b

J.-M. Désert

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Astronomy & Astrophysics, Accepted (2008arXiv0809.1865D)

The presence of titanium oxide (TiO) and vanadium oxide (VO) gas phase species is searched for in the atmosphere of the hot Jupiter HD 209458b.

We compared a model for the planet's transmitted spectrum to multi-wavelength eclipse-depth measurements (from 3 000 to 10 000 Å), obtained by Sing et al. (2008a) using archived HST-STIS time series spectra. We make use of these observations to search for spectral signatures from extra absorbers in the planet atmosphere between 6 000 and 8 000 Å.

Along with sodium depletion and Rayleigh scattering recently published for this exoplanet atmosphere, an extra absorber of uncertain origin, redward of the sodium lines, resides in the atmosphere of the planet. Furthermore, this planet has a stratosphere experiencing a thermal inversion caused by the capture of optical stellar flux by absorbers that resides at altitude. Recent models have predicted that the presence of TiO and VO in the atmosphere of HD 209458b may be responsible for this temperature inversion. Although no specific TiO and VO spectral band head signatures have been identified unambiguously in the observed spectrum, we suggest here that the opacities of those molecules are possible candidates to explain the remaining continuous broad band absorption observed between 6 200 and 8 000 Å. To match reasonably well the data, the abundances of TiO and VO molecules are evaluated from ten to one thousand times below solar. This upper limit result is in agreement with expected variations with altitude due to depletion effects such as condensation.

Download/Website: `http://arxiv.org/abs/0809.1865`

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A comparison of exoplanet transit-search algorithm performance using real SuperWASP data

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Astronomy & Astrophysics, Submitted

Many wide-field transiting exoplanet surveys are now in operation, observing millions of stars and searching for the 10 mmag periodic signals that may indicate planets orbiting a small subset of these objects. However, there has been comparatively little published work on determining the best algorithm to extract transiting planet signals. Specifically, published research on comparison of the various algorithms is not directly applicable to data of the quality and noise content actually seen in current ground-based, wide-field surveys. In addition, none has addressed the fundamental issue of maximising planet yield through e.g. an evaluation of the overlap in detections of the best-performing algorithms.

With the goal of maximising the planet yield of SuperWASP (and other transit surveys), we have undertaken research to test the performance of the three main mature transit detection algorithms against each other using real data.

Real lightcurves from the WASP archives were used in the analyses. After removing any potential candidate or variable objects, transits were injected into each lightcurve. We performed 300 Monte Carlo runs, each testing the recovery of injected signals by all algorithms in 99 lightcurves.

It was determined that the box-least squares should detect a total of 45% of planets, the matched filter algorithm should detect 30%, and the maximum likelihood approach would detect 8%. Using a combinations of the box-least squares and matched-filter algorithm should detect 51% of transiting hot Jupiter planets in the WASP data.

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Enhanced Dust Emission in the HL Tau Disc: A Low-Mass Companion in Formation?

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Monthly Notices of the Royal Astronomical Society, in press (arXiv 0809.4151)

We have imaged the disc of the young star HL Tau using the VLA at 1.3 cm, with $0.08''$ resolution (as small as the orbit of Jupiter). The disc is around half the stellar mass, assuming a canonical gas-mass conversion from the measured mass in large dust grains. A simulation shows that such discs are gravitationally unstable, and can fragment at radii of a few tens of AU to form planets. The VLA image shows a compact feature in the disc at 65 AU radius (confirming the 'nebulosity' of Welch et al. 2004), which is interpreted as a localised surface density enhancement representing a candidate proto-planet in its earliest accretion phase. If correct, this is the first image of a low-mass companion object seen together with the parent disc material out of which it is forming. The object has an inferred gas plus dust mass of $\approx 14\,\mathrm{M_{Jupiter}}$, similar to the mass of a proto-planet formed in the simulation. The disc instability may have been enhanced by a stellar flyby: the proper motion of the nearby star XZ Tau shows it could have recently passed the HL Tau disc as close as ~ 600 AU.

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Jupiter – friend or foe? I: the asteroids

J. Horner & B.W. Jones

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Int. Jnl. Astrobiology, in press

The asteroids are the major source of potential impactors on the Earth today. It has long been assumed that the giant planet Jupiter acts as a shield, significantly lowering the impact rate on the Earth from both cometary and asteroidal bodies. Such shielding, it is claimed, enabled the development and evolution of life in a collisional environment which is not overly hostile. The reduced frequency of impacts, and of related mass extinctions, would have allowed life the time to thrive, where it would otherwise have been suppressed. However, in the past, little work has been carried out to examine the validity of this idea. In the first of several papers, we examine the degree to which the impact risk resulting from a population representative of the asteroids is enhanced or lessened by the presence of a giant planet, in an attempt to fully understand the impact regime under which life on Earth has developed. Our results show that the situation is far less clear cut that has previously been assumed – for example, the presence of a giant planet can act to enhance significantly the impact rate of asteroids at the Earth.

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A comparison of chemistry and dust cloud formation in ultracool dwarf model atmospheres

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Monthly Notices of the Royal Astronomical Society, in press (arXiv:0809.3657v1)

The atmospheres of substellar objects contain clouds of oxides, iron, silicates, and other refractory condensates. Water clouds are expected in the coolest objects. The opacity of these 'dust' clouds strongly affects both the atmospheric temperature-pressure profile and the emergent flux. Thus any attempt to model the spectra of these atmospheres must incorporate a cloud model. However the diversity of cloud models in atmospheric simulations is large and it is not always clear how the underlying physics of the various models compare. Likewise the observational consequences of different modelling approaches can be masked by other model differences, making objective comparisons challenging. In order to clarify the current state of the modelling approaches, this paper compares five different cloud models in two sets of tests. Test case 1 tests the dust cloud models for a prescribed L, L–T, and T-dwarf atmospheric (temperature T, pressure p, convective velocity $v_{\rm conv}$)-structures. Test case 2 compares complete model atmosphere results for given (effective temperature $\rm T_{eff}$, surface gravity $\log g$). All models agree on the global cloud structure but differ in opacity-relevant details like grain size, amount of dust, dust and gas-phase composition. These models can loosely be grouped into *high-* and *low-altitude cloud* models whereas the first appear generally redder in near-infrared colours then the later. Comparisons of synthetic photometric fluxes translate into an modelling uncertainty in apparent magnitudes for our L-dwarf (T-dwarf) test case of $0.25 \lesssim \Delta m \lesssim 0.875$ ($0.1 \lesssim \Delta m \lesssim 1.375$) taking into account the 2MASS, the UKIRT WFCAM, the Spitzer IRAC, and VLT VISIR filters with UKIRT WFCAM being the most challenging for the models. Future developments will need closer links with laboratory astrophysics, and a consistent treatment of the cloud chemistry and turbulence.

Download/Website: `http://arxiv.org/abs/0809.3657`

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Tidal Heating of Terrestrial Extra-Solar Planets and Implications for their Habitability

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Monthly Notices of the Royal Astronomical Society, accepted (arXiv:0808.2770)

The tidal heating of hypothetical rocky (or terrestrial) extra-solar planets spans a wide range of values depending on stellar masses and initial orbits. Tidal heating may be sufficiently large (in many cases, in excess of radiogenic heating) and long-lived to drive plate tectonics, similar to the Earth's, which may enhance the planet's habitability. In other cases, excessive tidal heating may result in Io-like planets with violent volcanism, probably rendering them

unsuitable for life. On water-rich planets, tidal heating may generate sub-surface oceans analogous to Europa's with similar prospects for habitability. Tidal heating may enhance the outgassing of volatiles, contributing to the formation and replenishment of a planet's atmosphere. To address these issues, we model the tidal heating and evolution of hypothetical extra-solar terrestrial planets. The results presented here constrain the orbital and physical properties required for planets to be habitable.

Download/Website: `http://xxx.lanl.gov/archive/astro-ph`

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Exoplanets – search methods, discoveries, and prospects for astrobiology

B.W. Jones

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Int. Jnl. Astrobiology, in press

Whereas the Solar System has Mars and Europa as the best candidates for finding fossil/extant life as we know it – based on complex carbon compounds and liquid water – the 263 (non-pulsar) planetary systems around other stars known at 15 September 2008 could between them possess many more planets where life might exist. Moreover, the number of these exoplanetary systems is growing steadily, and with this growth there is an increase in the number of planets that could bear carbon-liquid water life. In this brief review the main methods by which exoplanets are being discovered are outlined, and then the discoveries that have so far been made are presented. This is followed by an account of likely future discoveries. Habitability is then discussed, and an outline presented of how a planet could be studied from afar to determine whether it is habitable, and whether it is indeed inhabited. This review is aimed at the astrobiology community, which spans many disciplines, few of which involve exoplanets. It is therefore at a basic level and concentrates on the major topics.

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An Eight-Octant Phase-Mask Coronagraph

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Publications of the Astronomical Society of the Pacific, in press (arXiv:0809.1510)

We present numerical simulations and laboratory experiments on an eight-octant phase-mask (EOPM) coronagraph. The numerical simulations suggest that an achievable contrast for the EOPM coronagraph can be greatly improved as compared to that of a four-quadrant phase-mask (FQPM) coronagraph for a partially resolved star. On-sky transmission maps reveal that the EOPM coronagraph has relatively high optical throughput, a small inner working angle and large discovery space. We have manufactured an eight-segment phase mask utilizing a nematic liquid-crystal device, which can be easily switched between the FQPM and the EOPM modes. The laboratory experiments demonstrate that the EOPM coronagraph has a better tolerance of the tip-tilt error than the FQPM one. We also discuss feasibility of a fully achromatic and high-throughput EOPM coronagraph utilizing a polarization interferometric technique.

Download/Website: `http://arxiv.org/abs/0809.1510`

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Prospects of Long-Time-Series Observations from Dome C for Transit Search

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Publications of the Astronomical Society of the Pacific, published (120:852859, 2008)

The detection of transiting extrasolar planets requires high-photometric quality and long-duration photometric stellar time series. In this paper, we investigate the advantages provided by the Antarctic observing platform Dome C for planet transit detections during its long winter period, which allows for relatively long uninterrupted time series. Our calculations include limiting effects due to the Sun and Moon, cloud coverage, and the effect of reduced photometric quality for high extinction of target fields. We compare the potential for long time series from Dome C with a single site in Chile, a three-site low-latitude network as well as combinations of Dome C with Chile and the network, respectively. Dome C is one of the prime astronomical sites on Earth for obtaining uninterrupted long-duration observations in terms of prospects for a high observational duty cycle. The duty cycle of a project can, however, be significantly improved by integrating Dome C into a network of sites.

Download/Website: `http://arxiv.org/abs/0807.2741`

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On the stability of Earth-like planets in multi-planet systems

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Celestial Mechanics and Dynamical Astronomy, in press

We present a continuation of our numerical study on planetary systems with similar characteristics like the solar system. This time we examine the influence of three giant planets on the motion of terrestrial-like planets in the habitable zone (HZ). Using the Jupiter-Saturn-Uranus configuration we create similar fictitious systems by varying Saturn's semi-major axis from 8 to 11 AU and increasing its mass by factors of 2 to 30. The analysis of the different systems shows the following interesting results:
(i) Using the masses of the solar system for the three giant planets, our study indicates a maximum eccentricity (max-e) of nearly 0.3 for a test-planet placed at the position of Venus. Such a high eccentricity was already found in our previous study of Jupiter-Saturn systems. Perturbations of the secular frequency g_5 are again responsible for this high eccentricity.
(ii) An increase of the Saturn-mass causes stronger perturbations around the position of the Earth and in the outer HZ. The latter is certainly due to gravitational interaction between Saturn and Uranus.
(iii) The Saturn-mass increased by a factor 5 or higher indicates high eccentricities for a test-planet placed at the position of Mars. So that a crossing of the Earth' orbit might occur in some cases.
Furthermore, we present the maximum eccentricity of a test-planet placed in the Earth' orbit for all positions (from 8 to 11 AU) and masses (increased up to a factor of 30) of Saturn. It can be seen that already a double-mass Saturn moving in its actual orbit causes an increase of the eccentricity up to 0.2 of a test-planet placed at Earth's position. A more massive Saturn orbiting the sun outside the 5:2 mean motion resonance ($\geq 9.7AU$) increases the eccentricity up to 0.4 for such a test-planet.

Download/Website: `http://dx.doi.org/10.1007/s10569-008-9159-0`

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Mean Motion Resonances from Planet-Planet Scattering

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Astrophysical Journal Letters, in press (arXiv.0809.3449)

Planet-planet scattering is the leading mechanism to explain the large eccentricities of the observed exoplanet population. However, scattering has not been considered important to the production of pairs of planets in mean motion resonances (MMRs). We present results from a large number of numerical simulations of dynamical instabilities in 3-planet systems. We show that MMRs arise naturally in about five percent of cases. The most common resonances we populate are the 2:1 and 3:1 MMRs, although a wide variety of MMRs can occur, including high-order MMRs (up to eleventh order). MMRs are generated preferentially in systems with uneven mass distributions: the smallest planet is typically ejected after a series of close encounters, leaving the remaining, more massive planets in resonance. The distribution of resonant planets is consistent with the phase-space density of resonant orbits, meaning that planets are randomly thrown into MMRs rather than being slowly pulled into them. It may be possible to distinguish between MMRs created by scattering vs. convergent migration in a gaseous disk by considering planetary mass ratios: resonant pairs of planets beyond ~ 1 AU with more massive outer planets are likely to have formed by scattering. In addition, scattering may be responsible for pairs of planets in high-order MMRs (3:1 and higher) that are not easily populated by migration. The frequency of MMRs from scattering is comparable to the expected survival rate of MMRs in turbulent disks. Thus, planet-planet scattering is likely to be a major contributor to the population of resonant planets.

Download/Website: `http://arXiv.org/abs/0809.3449`

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3 Conference announcements

Molecules in the Atmospheres of Extrasolar Planets

J.P. Beaulieu, I. Ribas & G. Tinetti

Salle Cassini, Observatoire Paris, Paris, France, November 19th – 21st 2008

Exoplanets are being discovered at an ever accelerating pace. As a result planetary scientists and astronomers are increasingly called upon to make the transition from discovery to characterization, so that we can begin the long journey of understanding these planets in the same way that we understand those in our own Solar System. Among the known exoplanets, hot-Jupiters and hot-Neptunes that transit their parent stars present the first real opportunities to determine key compositional and atmospheric parameters.

The atmospheres of transiting hot-Jupiters are now starting to be probed for water vapour, carbon/nitrogen/sulphur bearing molecules. The results will provide us with a first insight on the photochemical composition and escape processes on the atmospheres of hot-Jupiters, and pave the way to do such studies on hot-Neptunes, super-Earths, and finally Earth-mass planets. This is a necessary step before proceeding with the study of cooler planets.

The workshop aims at bringing together different scientific communities: solar system planetary scientists, brown dwarf and exoplanet modellers and observers, molecular spectroscopy and instrument development experts. We will

cover different topics : radiative transfer, line lists, photochemical models, dynamics, observations using ground based facilities (high-resolution spectroscopy in the optical and in the IR), and space-based observations. Present days results will be discussed in the context of the preparation of upcoming warm SPITZER, JWST, SPICA, and the next generation of direct detection mission concepts from ground and space.

Scientific Organising Committee: J.P. Beaulieu (co-chair), T. Guillot, H. Lammer, D. Latham, D. Lin, J.P. Maillard, I. Ribas (co-chair), J. Schneider, F. Selsis, J. Tennyson, G. Tinetti (co-chair), S. Udry.
Local Organising Committee: V. Batista, D. Kipping

Confirmed speakers: A. Aylward, B. Bezard, A. Bocaletti, A. Burgasser, S. Carey, W. Cash, D. Charbonneau, J. Cho, A. Collier-Cameron, V. Coude du Foresto, K. Enya, R. Gratton, J. Harrington, H. Knutson, O Lahav, H. Lammer, J.P. Maillard, M. Marley, S. Miller, E. Palle, F. Selsis, E Serabyn, A. Showman, J. Schneider, D. Stam, M. Swain, B. Swinyard, J. Tennysson, W. Traub, G.Vasisht, Y. Yung.
Registration is opened: Register now!

Proceedings will be published by the ASP Conference Series (editors Beaulieu, Ribas, Tinetti).

Download/Website: `http://www.iap.fr/scripts/colloques/molecules2008/regmenu.asp`

Pathways Towards Habitable Planets

Vincent Coudé du Foresto

CosmoCaixa science museum, Barcelona, Spain, September 14th – 18th, 2009

We are organizing an international scientific conference, to be held on 14-18 September 2008. The venue is the CosmoCaixa science museum in Barcelona, Spain.

One of the most important scientific challenges for the 21st century is the search of habitable worlds around other stars, and the characterization of their atmospheres with the goal of detecting signs of biological activity. This is a long-term, interdisciplinary endeavor, engaging astrophysicists, biologists, planetary scientists, and instrument scientists. Eventually, space missions will address those questions, however today we need to start making intermediate steps. The aim of this conference is to help integrate the prospective efforts in Europe and in the US, build a community around this theme, and lay out a road map towards that goal.

The conference will include introductory lectures, invited talks, contributed talks and posters on the major scientific topics listed below, as well as public talks. The conference is sponsored in part by the Spanish CSIC, the Catalan IEEC, the NASA ExoPlanet Science Institute, and the Blue Dots initiative.

SCIENTIFIC TOPICS:
New Search Strategies for Exoplanets; Characterizing Exoplanetary Atmospheres; Formation and Evolution of Planetary Systems; Conditions for Life; Future projects and space missions

We encourage you to circulate the announcement among your colleagues, and to bookmark this website (http://www.pathways2009.net) as your primary source for the latest information on the Pathways conference.

Vincent Coudé du Foresto, on behalf of the Scientific Organizing Committee

Download/Website: `http://www.pathways2009.net`

Towards Other Earths: perspectives and limitations in the ELT era

Nuno C. Santos, Claudio Melo, Luca Pasquini, Andreas Glindemann

Porto, Portugal, October 19th – 23rd 2009

SCIENTIFIC RATIONALE

To allow the discovery of other Earths, a new generation of instruments and telescopes is now being conceived and built by different teams around the world. This includes a new generation of Extremely Large Telescopes (ELT). Thanks to the diameter of their primary mirrors, the detection of earth-mass planets is expected to be within the reach of these ELTs.

In parallel, a new generation of instruments for current 8 to 10-m class facilities is being planned. These new cutting-edge suite of instruments include High-angular resolution AO imagers, micro-arcsec astrometry made with interferometers, and ultra stable spectrographs at a cm/s level. Synergy of these facilities with spaced-based observatories will play a key role in the discovery of earth-mass planets.

What are the requirements that this instrumentation have to match to allow us to find other Earths? Do we know how to calibrate the instruments to achieve such a precision and stability? Equally important are the limitations imposed by intrinsic astrophysical phenomena such as stellar activity, granulation, or oscillations. Are we preparing ourselves to deal and to correct for these effects? Which are the ultimate limitations for the different techniques mounted on ground- or space-based facilities? We therefore want to gather the community of planetary astronomers and instrumentalists working on the field to:

- review what is the current status of the search for telluric exoplanets, and present our understanding about their formation;
- discuss the implications of their main physical properties in the detectability limit by different techniques;
- draw a coherent picture of what are the technical and physical issues that we have to solve in order to endeavor this fabulous task of finding and characterizing other Earths.

Our conference will give particular emphasis to the contribution from the upcoming generation of extremely large telescopes (ELTs) to this task of finding and characterizing other Earths.

LOCATION

The conference will take place in the town of Porto, Portugal. More details will be available at the conference web page. Porto (Oporto in English), is the second largest town in Portugal. It is located in the estuary of the Douro river, facing the Atlantic ocean. The city is about 300 Km north of the portuguese capital (Lisbon), and is renowned for its famous Port (Porto) Wine. The wine itself is produced in the Douro valley, in what was the first wine demarcated region of the world. The beauty of this beautiful area, with landscapes carved by men and nature in an unique way, is today UNESCO's world "World Heritage Patrimony Sight". Porto's historical centre itself was classified by the UNESCO as "World Cultural Heritage" in December 1996.

IMPORTANT DATES

- December 31st, 2008: Pre-registration deadline (to receive information)
- July 30th, 2009: Abstract submission deadline

- September 18th, 2009: Registration deadline
- October 19th, 2009: Welcome to Porto

PRE-REGISTRATION / REGISTRATION

If you are interested in receiving further announcements, please express your interest to participate in this conference by pre-registering at the web site of the conference.

Registration will be open in January 2009. Details on the registration fee and payment will then be given.

PROGRAM

In addition to invited talks, contributed papers (oral or poster) can be presented. The SOC will select a limited number of contributions for oral presentation on the basis of the submitted abstracts.

CONTACT INFORMATION

For inquiries concerning travel, accommodation, and other logistic details, please contact the LOC:

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Please feel free to disseminate this information among your colleagues. We are looking forward to meeting you in Porto. On behalf of the SOC and LOC,

With best regards,
Nuno C. Santos, Claudio Melo, Luca Pasquini, Andreas Glindemann

Download/Website: `http://www.astro.up.pt/investigacao/conferencias/toe2009`

Contact: `toe2009@astro.up.pt`

4 Jobs and positions

Postdoctoral Position in Exoplanetary Science

Ben R. Oppenheimer
American Museum of Natural History, Department of Astrophysics, 79th Street at Central Park West, New York, NY 10024 USA

American Museum of Natural History, Start: Spring/Summer 2009

The Department of Astrophysics invites applications for a postdoctoral position in exoplanetary science, contingent on funding. This position is distinct from our annual Fellowship competition. The successful applicant will work in association with Oppenheimer's exoplanet research group, but will be expected to develop independence. The group recently deployed Project 1640 at the Palomar 200" telescope, involving a new hyper-spectral imaging device, a coronagraph and adaptive optics. The group is also an integral member of the Gemini Planet Imager, on which the applicant may work.

Unlike most appointments in the department, the position has 30 percent of its time devoted to the spectacular array of education and public outreach efforts at AMNH. In particular, the position would act as curatorial advisor on the bi-weekly AstroBulletin stories and semi-annual documentaries (see sciencebulletins.amnh.org), of which Oppenheimer is Curator-in-Charge. Additionally, our involvement in the E/PO effort for the WISE mission would allow development of related content for planetarium programs, and the broader museum education programming spanning grade-school levels to teacher training efforts.

This 2-year position will have a third contingent on performance and funding. Applicants should send a CV, a 2-page statement describing research already conducted and E/PO experience, a second statement proposing research to be conducted during the appointment, and arrange for three letters of recommendation to be sent independent of the application. All materials should be sent, by November 15 2008, in PDF format to Ms. Gwendolyn King, gking@amnh.org, with the subject line "Exoplanet Postdoc." The Museum is an equal opportunity employer.

http://www.lyot.org (The Lyot Project)
http://www.ast.cam.ac.uk/∼optics/project1640/p1640_index.html (Project 1640)
http://research.amnh.org/astrophysics/ (AMNH Astrophysics)

Submission Address for Resumes/CVs
Gwendolyn King, Administrative Assistant
American Museum of Natural History
Department of Astrophysics
79th Street at Central Park West
New York, NY 10024
USA
212-313-7441
212-769-5007

Contact: `gking@amnh.org`

5 As seen on astro-ph

The following list contains all the entries relating to exoplanets that we spotted on astro-ph during August and September 2008. If you spot any that we missed, please let us know and we'll include them in the next issue.

Exoplanets

astro-ph/0808.0004: **Inferring statistics of planet populations by means of automated microlensing searches** by *M. Dominik, U. G. Jorgensen, K. Horne et al*

astro-ph/0808.0005: **Towards A Census of Earth-mass Exo-planets with Gravitational Microlensing** by *J.P. Beaulieu, E. Kerins, S. Mao et al*

astro-ph/0808.0176: **Analytic approximations for transit light curve observables and uncertainties** by *Joshua A. Carter, Jennifer C. Yee, Jason Eastman et al*

astro-ph/0808.1289: **Emergent Exoplanet Flux: Review of the Spitzer Results** by *Drake Deming*

astro-ph/0808.1890: **Constraining Orbital Parameters Through Planetary Transit Monitoring** by *Stephen R. Kane, Kaspar von Braun*

astro-ph/0808.1902: **The Atmospheric Signatures of Super-Earths: How to Distinguish Between Hydrogen-Rich and Hydrogen-Poor Atmospheres** by *E. Miller-Ricci, D. Sasselov, S. Seager*

astro-ph/0808.1908: **Coreless Terrestrial Exoplanets** by *L. Elkins-Tanton, S. Seager*

astro-ph/0808.1909: **Ranges of Atmospheric Mass and Composition of Super Earth Exoplanets** by *L. Elkins-Tanton, S. Seager*

astro-ph/0808.1916: **A Computational Tool to Interpret the Bulk Composition of Solid Exoplanets based on Mass and Radius Measurements** by *Li Zeng, Sara Seager*

astro-ph/0808.2787: **Core Formation in Giant Gaseous Protoplanets** by *Ravit Helled, Gerald Schubert*

astro-ph/0808.2823: **Planet-bound dark matter and the internal heat of Uranus, Neptune, and hot-Jupiter exoplanets** by *Stephen L. Adler*

astro-ph/0808.2836: **TW Hydrae: evidence of stellar spots instead of a Hot Jupiter** by *N. Huelamo, P. Figueira, X. Bonfils et al*

astro-ph/0808.2889: **Radio emission from exoplanets: the role of the stellar coronal density and magnetic field strength** by *M. Jardine, A.C. Cameron*

astro-ph/0808.3007: **The Rise of the Vulcans** by *David Charbonneau*

astro-ph/0808.3014: **Microlensing Zone of Planets Detectable through the Channel of High-Magnification Events** by *Cheongho Han*

astro-ph/0808.3118: **A New Atmospheric Model for HD 189733 b** by *Jonathan Langton, Gregory Laughlin*

astro-ph/0808.3295: **A dynamical perspective on additional planets in 55 Cancri** by *Sean N. Raymond, Rory Barnes, Noel Gorelick*

astro-ph/0808.3724: **On The Origins Of Eccentric Close-in Planets** by *Soko Matsumura, Genya Takeda, Fred Rasio*

astro-ph/0808.3917: **Exoplanet characterization with long slit spectroscopy** by *Arthur Vigan, Maud Langlois, Claire Moutou et al*

astro-ph/0808.3917: **Lithium depletion and the rotational history of exoplanet host stars** by *Jerome Bouvier*

astro-ph/0809.0172: **A Jupiter-like Planet Orbiting the Nearby M Dwarf GJ832** by *Jeremy Bailey, R. Paul Butler, C.G. Tinney et al*

astro-ph/0809.0187: **CoRoT and stellar activity: preliminary results from the modelling of CoRoT-Exo-2a** by *A. F. Lanza, I. Pagano, G. Leto et al*

astro-ph/0809.0242: **What do stars tell us about planets? Asteroseismology of exoplanet-host stars** by *Sylvie Vauclair*

astro-ph/0809.0750: **The HARPS search for southern extra-solar planets: XIV. Gl 176b, a super-Earth rather than a Neptune, and at a different period** by *T. Forveille, X. Bonfils, X. Delfosse et al*

astro-ph/0809.1037: **Two Jupiter-Mass Planets Orbiting HD 154672 and HD 205739** by *Mercedes Lopez-Morales, R. Paul Butler, Debra A. Fischer et al*

astro-ph/0809.1275: **How eccentric orbital solutions can hide planetary systems in 2:1 resonant orbits** by *Guillem Anglada-Escude, Mercedes Lopez-Morales, John E. Chambers*

astro-ph/0809.1651: **The Signature of the Ice Line and Modest Type I Migration in the Observed Exoplanet Mass-Semimajor Axis Distribution** by *Kevin C. Schlaufman, D.N.C. Lin, S. Ida*

astro-ph/0809.1671: **Atmospheric Circulation of Hot Jupiters: A Shallow Three-Dimensional Model** by *Kristen Menou, Emily Rauscher*

astro-ph/0809.1865: **TiO and VO broad band absorption features in the optical spectrum of the atmosphere of the hot-Jupiter HD209458b** by *J.-M. Desert, A. Vidal-Madjar, A. Lecavelier des Etangs et al*

astro-ph/0809.2089: **Atmospheric circulation of hot Jupiters: Coupled radiative-dynamical general circulation model simulations of HD 189733b and HD 209458b** by *Adam P. Showman, Jonathan J. Fortney, Yuan Lian*

astro-ph/0809.2997: **Microlensing Event MOA-2007-BLG-400: Exhuming the Buried Signature of a Cool, Jovian-Mass Planet** by *Subo Dong, I.A. Bond, A. Gould et al*

astro-ph/0809.3449: **Mean motion resonances from planet-planet scattering** by *Sean N. Raymond, Rory Barnes, Philip J. Armitage et al*

astro-ph/0808.3582: **CARMA Millimeter-Wave Aperture Synthesis Imaging of the HD 32297 Debris Disk** by *H. L. Maness, M. P. Fitzgerald, R. Paladini et al*

astro-ph/0809.3862: **Extrasolar planets and brown dwarfs around A-F type stars V. A planetary system found with HARPS around the F6IV-V star HD 60532** by *M. Desort, A.-M. Lagrange, F. Galland et al*

astro-ph/0809.3990: **Cryptic photosynthesis, Extrasolar planetary oxygen without a surface biological signature** by *C. S. Cockell, L. Kaltenegger, J. A. Raven*

astro-ph/0809.4295: **HAT-P-10b: A light and moderately hot Jupiter transiting a K dwarf** by *G. A. Bakos, A. Pal, G. Torres et al*

astro-ph/0809.4482: **Star-Planet Interactions** by *Evgenya Shkolnik, Suzanne Aigrain, Steven Cranmer et al*

astro-ph/0809.4589: **A New Spectroscopic and Photometric Analysis of the Transiting Planet Systems TrES-3 and TrES-4** by *A. Sozzetti, G. Torres, D. Charbonneau*

astro-ph/0809.4597: **The sub-Jupiter mass transiting exoplanet WASP-11b** by *R. G. West, A. Collier Cameron, L. Hebb et al*

astro-ph/0809.4636: **Extrasolar planets and brown dwarfs around A-F type stars VI. High precision RV survey of early type dwarfs with HARPS** by *A.-M. Lagrange, M. Desort, F. Galland et al*

astro-ph/0809.4664: **The Atmospheres of Extrasolar Planets** by *Mark S. Marley*

Disks

astro-ph/0808.1439: **Gas disks to gas giants: Simulating the birth of planetary systems** by *Edward W. Thommes, Soko Matsumura, Frederic A. Rasio*

astro-ph/0808.3224: **The Kuiper Belt and Other Debris Disks** by *David Jewitt, Amaya Moro-Martn, Pedro Lacerda*

astro-ph/0809.1500: **Searching for molecular hydrogen mid-infrared emission in the circumstellar environments of Herbig Be stars** by *C. Martin-Zaidi, E.F. van Dishoeck, J.-C. Augereau et al*

astro-ph/0809.1651: **The Signature of the Ice Line and Modest Type I Migration in the Observed Exoplanet Mass-Semimajor Axis Distribution** by *Kevin C. Schlaufman, D.N.C. Lin, S. Ida*

astro-ph/0809.2855: **Planet Migration through a Self-Gravitating Planetesimal Disk** by *Alexander J. Moore, Alice C. Quillen, Richard G. Edgar*

astro-ph/0809.3749: **The Growth & Migration of Jovian Planets in Evolving Protostellar Disks with Dead Zones** by *Soko Matsumura, Ralph E. Pudritz, Edward W. Thommes*

astro-ph/0809.4137: **Gas Evolution in Protoplanetary Disks** by *Peter Woitke, Bill Dent, Wing-Fai Thi et al*

astro-ph/0809.4151: **Enhanced Dust Emission in the HL Tau Disc: A Low-Mass Companion in Formation?** by *J. S. Greaves, A. M. S. Richards, W. K. M. Rice et al*
astro-ph/0809.5220: **Vortices in self-gravitating disks** by *G.R. Mamatsashvili, W.K.M. Rice*

Instrumentation and Techniques

astro-ph/0808.1913: **Transiting Exoplanets with JWST** by *S. Seager, D. Deming, J. A. Valenti*
astro-ph/0808.2754: **Worlds Beyond: A Strategy for the Detection and Characterization of Exoplanets** by *J. I. Lunine, D. Fischer, H. Hammel*
astro-ph/0808.3713: **Nulling interferometry: performance comparison between space and ground-based sites for exozodiacal disc detection** by *D. Defrere, O. Absil, V. Coude du Foresto et al*
astro-ph/0809.0242: **Using SPICA Space Telescope to characterize Exoplanets** by *J.R. Goicoechea, B. Swinyard, G. Tinetti et al*
astro-ph/0809.1435: **High Precision Radial Velocity Measurements in the Infrared: A First Assessment of the RV Stability of CRIRES** by *Andreas Seifahrt, Hans-Ulrich Kaeufl*
astro-ph/0809.2876: **Comparison of coronagraphs for high contrast imaging in the context of Extremely Large Telescopes** by *P. Martinez, A. Boccaletti, M. Kasper et al*
astro-ph/0809.1510: **An Eight-Octant Phase-Mask Coronagraph** by *N. Murakami, R. Uemura, N. Baba et al*
astro-ph/0809.3012: **NICI: combining coronagraphy, ADI, and SDI** by *Etienne Artigau, Beth A. Biller, Zahed Wahhaj et al*
astro-ph/0809.3020: **Observing Strategies for the NICI Campaign to Directly Image Extrasolar Planets** by *Beth Biller, Etienne Artigau, Zahed Wahhaj et al*
astro-ph/0809.3351: **RISE: a fast-readout imager for exoplanet transit timing** by *I. A. Steele, S. D. Bates, N. Gibson et al*
astro-ph/0809.3655: **Behavior of the reflection function of a plane-parallel medium for directions of incidence and reflection tending to horizontal directions** by *J. W. Hovenier & D. M. Stam*
astro-ph/0809.3721: **An Inexpensive Field-Widened Monolithic Michelson Interferometer for Precision Radial Velocity Measurements** by *Suvrath Mahadevan, Jian Ge, Scott W. Fleming et al*
astro-ph/0809.4042: **ESA White paper: Atmospheric modeling: Setting Biomarkers in context** by *L. Kaltenegger, F. Selsis*
astro-ph/0809.4391: **ASTEP South: An Antarctic Search for Transiting Planets around the celestial South pole** by *Nicolas Crouzet, Karim Agabi, Alain Blazit et al*
astro-ph/0809.4999: **LIINUS/SERPIL: a design study for interferometric imaging spectroscopy at the LBT** by *F. Mueller Sanchez, C. Gal, F. Eisenhauer et al*