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1 Editorial

Welcome to the eleventh edition of ExoPlanet News, an electronic newsletter reporting the latest developments and research outputs in the field of exoplanets.

This edition marks the completion of our first year of the Exoplanet News. Over that time we have included the abstracts of over 70 refereed papers, 5 PhD theses, 14 job adverts, 15 conference announcements and listed about 600 papers as seen on astro-ph. We hope it continues to be useful and informative for our readership. If it is, please continue to send us abstracts for future editions and encourage your colleagues to do likewise.

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

Toward detection of terrestrial planets in the habitable zone of our closest neighbor: Proxima Centauri

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Astronomy & Astrophysics, in press (arXiv:0807.1452)

The precision of radial velocity (RV) measurements to detect indirectly planetary companions of nearby stars has improved to enable the discovery of extrasolar planets in the Neptune and Super-Earth mass range. Detections of extremely low mass planets, even as small as 1 Earth mass or below, in short-period orbits now appears conceivable in ongoing RV planet searches. Discoveries of these Earth-like planets by means of ground-based RV programs will help to determine the parameter η_{\oplus} , the frequency of potentially habitable planets around other stars. In search of low-mass planetary companions we monitored Proxima Centauri (M5V) as part of our M dwarf program. In the absence of a significant detection, we use these data to demonstrate the general capability of the RV method in finding terrestrial planets. For late M dwarfs the classic liquid surface water habitable zone (HZ) is located close to the star, in which circumstances the RV method is most effective. We want to demonstrate that late M dwarfs are ideal targets for the search of terrestrial planets with the RV technique. Using the iodine cell technique we obtained differential RV measurements of Proxima Cen over a time span of 7 years with the UVES spectrograph at the ESO VLT. We determine upper limits to the masses of companions in circular orbits by means of numerical simulations. The RV data of Proxima Cen have a total rms scatter of 3.1 m s^{-1} and a period search does not reveal any significant signals. In contrast to our earlier results for Barnard's star, the RV results for the active M dwarf Proxima Cen are only weakly correlated with H_{α} line index measurements. As a result of our companion limit calculations, we find that we successfully recover all test signals with RV amplitudes corresponding to planets with $m \sin i \geq 2 - 3 M_{\oplus}$ residing inside the HZ of Proxima Cen with a statistical significance of $> 99\%$. Over the same period range, we can

recover 50% of the test planets with masses of $m \sin i \geq 1.5 - 2.5 M_{\oplus}$. Based on our simulations, we exclude the presence of any planet in a circular orbit with $m \sin i \geq 1 M_{\text{Neptune}}$ at separations of $a \leq 1$ AU.

Contact: mike@astro.as.utexas.edu

Dynamics and stability of telluric planets within the habitable zone of extrasolar planetary systems: Numerical simulations of test particles within the HD 4208 and HD 70642 systems

T. C. Hinse^{1,2}, R. Michelsen¹, U. G. Jørgensen¹, K. Goździewski³, S. Mikkola⁴

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² Armagh Observatory, College Hill, BT61 9DG, Northern Ireland, UK.

³ Nicolaus Copernicus University, Torun Centre for Astronomy, Gagarin Str. 11, PL-87-100 Torun, Poland.

⁴ Turku University Observatory, Väisäläntie 20, Piikkiö, Finland.

Astronomy & Astrophysics, accepted for publication - in press

We study gravitational perturbation effects of observed giant extrasolar planets on hypothetical Earth-like planets in the context of the three-body problem. This paper (accepted for publication in *Astronomy & Astrophysics*) considers a large parameter survey of different orbital configuration of two extrasolar giant planets (HD 70642b and HD 4208b) and compares their dynamical effect on Earth-mass planetary orbits initially located within the respective habitable terrestrial region. We are interested in determining giant planet orbit (and mass) parameters that favors the condition to render an Earth-mass planet to remain on a stable and bounded orbit within the continuous habitable zone.

Download/Website: <http://www.astro.ku.dk/~tobiash>

Contact: tobiash@astro.ku.dk

Prospects for the habitability of OGLE-2006-BLG-109L

Renu Malhotra, David A. Minton

University of Arizona, Tucson, AZ, USA

Astrophysical Journal Letters, vol. 683, L67 (2008)

The extrasolar system OGLE-2006-BLG-109L is the first multiple-planet system to be discovered by gravitational microlensing (Gaudi et al., 2008); the two large planets that have been detected have mass ratios, semimajor axis ratios, and equilibrium temperatures that are similar to those of Jupiter and Saturn; the mass of the host star is only $0.5 M_{\odot}$, and the system is more compact than our own Solar system. We find that in the habitable zone of the host star, the two detected planets resonantly excite large orbital eccentricities on a putative earth-mass planet, driving such a planet out of the habitable zone. We show that an additional inner planet of $\gtrsim 0.3 M_{\oplus}$ at $\lesssim 0.1$ AU would suppress the eccentricity perturbation and greatly improve the prospects for habitability of the system. Thus, the planetary architecture of a potentially habitable OGLE-2006-BLG-109L planetary system – with two “terrestrial” planets and two jovian planets – could bear very close resemblance to our own Solar system.

Download/Website: http://www.lpl.arizona.edu/people/faculty/malhotra_preprints/pubs.html

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Precise Wavefront Correction with an Unbalanced Nulling Interferometer for Exo-Planet Imaging Coronagraphs

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Astronomy & Astrophysics, in press (arXiv:0806.2026)

We propose a novel method based on a pre-optics setup that behaves partly as a low-efficiency coronagraph, and partly as a high-sensitivity wavefront aberration compensator (phase and amplitude). The combination of the two effects results in a highly accurate corrected wavefront. First, an (intensity-) unbalanced nulling interferometer (UNI) performs a rejection of part of the wavefront electric field. Then the recombined output wavefront has its input aberrations magnified. Because of the unbalanced recombination scheme, aberrations can be free of phase singular points (zeros) and can therefore be compensated by a downstream phase and amplitude correction (PAC) adaptive optics system, using two deformable mirrors. In the image plane, the central star's peak intensity and the noise level of its speckled halo are reduced by the UNI-PAC combination: the output-corrected wavefront aberrations can be interpreted as an improved compensation of the initial (eventually already corrected) incident wavefront aberrations. The important conclusion is that not all the elements in the optical setup using UNI-PAC need to reach the $\lambda/10000$ rms surface error quality.

Download/Website: <http://arxiv.org/abs/0806.2026>

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3 Conference announcements

ESLAB 2008: Cosmic Cataclysms and life

Nicolas André

ESA

ESRIN (Frascati, Italy), 10–14 November 2008

A number of cataclysms have occurred in the history of the universe and the Solar System. The Symposium will review those that had a critical influence on the evolution of habitable worlds and on the emergence and survival of life on Earth, and possibly elsewhere.

Abstract Deadline: September 2008

Confirmed Invited Speakers:

L. Ziurys (Arizona), J. Truran (Chicago), J. Blum (Braunschweig), J. Greaves (St Andrews), A. Morbidelli (Nice), D. Kring (Arizona), G. Horneck (Köln), D. Prieur (Brest), P. Ehrenfreund (Washington), K.-H. Glassmeier (Braunschweig), I. Ribas (Madrid), B. Thomas (Washburn), F. Selsis (Bordeaux), T. Owen (Hawaii), V. Trimble (Irvine), E. Pilat-Lohinger (Vienna)

Programme:

Monday 10 November 2008

- Introduction: Cosmic Cataclysms: the biological overview
- Session 1: Big Bang and Nucleosynthesis

Tuesday 11 November 2008

- Session 2: Star Formation and Synthesis of Molecules
- Session 3: Planetary formation and the role of collisions

Wednesday 12 November 2008

- Session 4: Late Heavy Bombardment, the Moon-Earth System and the Emergence of Life on Earth
- Session 5: The Role of Impacts on Life

Thursday 13 November 2008

- Session 6: Emergence and habitats of life for the Universe
- Session 7: Hazards from the Sun, Stars and the universe and resilience of Life

Friday 14 November 2008

- Session 8: Cosmic habitability, prevalence of Earth-like planets and the fate of the Earth

Scientific Organizing Committee

J.-C. Augereau, W. Benz, A. Chicarro, C. Cockell, B. Foing, L. Kaltenegger, H. Lammer, R. Liseau, H. Opgenoorth, G. Wuechterl, F. Westall

Local Organizing Committee

N. André, C. Bingham, M. Fridlund, O. Witasse

Download/Website: <http://www.congrex.nl/08c16>

Contact: esa.conference.bureau@esa.int

Royal Observatory Edinburgh Workshop 2008: Habitability in our Galaxy

Ken Rice

Royal Observatory Edinburgh

Edinburgh, 8–10 October 2008

Topics of the Workshop:

1. Exoplanets: observation, habitability, and future ground-based and space projects
2. Solar System: life in the Solar System, current and future missions to Solar System objects
3. Origin and Prospects for Life: signature of life, extraterrestrial life (including SETI), simulation of extreme environments

Invited speakers (not definitive list):

Monica Grady (Open University), Jane Greaves (Univ. of St-Andrews), Andrew Cameron (Univ. of St-Andrews), Don Pollacco (Queens University, Belfast), John Parnell (Univ. of Aberdeen), Helen Fraser (Strathclyde University), Charles Cockell (Open University), Bob Nichol (Univ. of Portsmouth), Simon Conway Morris (Cambridge), Markus Kasper (ESO)

Public Lecture by Prof. Monica Grady (Open University), 8 October 2008, at our Dynamic Earth, Edinburgh (<http://www.dynamicearth.co.uk/>)

Download/Website: <http://www.roe.ac.uk/roe/workshop/2008>

Contact: wfdt@roe.ac.uk

The Formation of Planets: The Solar System and Extrasolar Planets

Willy Kley

University of Tübingen

University of Tübingen, Germany, March 2-6, 2009

After the discovery of about 300 extrasolar planets and recent new observations made within our own Solar System, the process of planet formation and the subsequent evolution of planetary systems in general has received the highest ever attention of the scientific community, on theoretical as well as observational side.

The aim of this meeting is to bring together scientists from diverse fields (e.g. astronomy, planetary science, mineralogy) to engage in active discussion on questions such as how to combine the increased observational knowledge about the formation phase of the Solar System with the constraints placed by extrasolar planetary systems. Further topics will range from the early phase of planet formation (growth to planetesimals) to important aspects of planetary system evolution as a whole. One major goal of the meeting is to clarify the main defining principles of the planet formation process without concentrating on specific details of particular systems.

Fields that will be covered are:

Solar System studies

Extrasolar planetary systems

Protoplanetary disc physics

Particle growth processes and planetesimal formation

The making of terrestrial and giant planets

Evolution of planetary systems

Download/Website: <http://www.tat.physik.uni-tuebingen.de/~fgp/Conf09/index.html>

Contact: fgp@tat.physik.uni-tuebingen.de

4 Announcements

Amino Acids and the Asymmetry of Life

Uwe Meierhenrich

Laboratoire de Chimie des Molécules Bioactives et des Arômes (LCMBA), UMR 6001, Université Nice-Sophia Antipolis, CNRS, Institut de Chimie de Nice, 28, Avenue Valrose, F-06108 Nice Cedex 2, France

Newly published book, August 2008

'How did life originate on Earth and why were specific amino acids selected for its architecture?' This question of high public and interdisciplinary scientific interest is the central theme of a new book written by professor Uwe Meierhenrich from the University of Nice. In 2002, his international research team realized that amino acids are not only required for the development of living organisms on Earth, but that large amounts of amino acids are constantly synthesized in interstellar clouds in space. This research result was published in *Nature* and attracted considerable attention worldwide. Today, the question 'did life as we know it find its molecular roots in space?' is asked in various scientific domains. Did the molecular building blocks of biological organisms really originate from interstellar clouds and did these building blocks trickle on the early Earth that acted in a way as a Petri dish to trigger the evolution of life? And if the answer to this question is 'yes', is there life on other planets, since numerous exoplanets had been discovered recently?

In order to answer this question, the asymmetry of amino acids was studied in more detail. It is well-known that the parity between right-handed amino acids and their left-handed mirror-images was violated for the origin of life. The

equilibrium was shifted in favor of left-handed amino acids. Nowadays, proteins of living organisms exclusively use left-handed amino acids as monomer building blocks. This information is used to decipher crucial aspects of the origin of life. Experiments onboard of the space missions Rosetta and ExoMars but also lab experiments on the symmetry-breaking of biomolecules focus on the handedness of prebiotic molecules and aim to clarify our understanding of the origin of life on Earth.

Written in an intoxicating style, this book describes how the basic building blocks of life, the amino acids, formed. After a comprehensible introduction into stereochemistry, the author addresses the inherent property of amino acids in living organisms, namely the preference for left-handedness. What was the cause for violation of parity of amino acids in the emergence of life on Earth? All the fascinating models proposed by physicists, chemists and biologist are vividly presented including the scientific conflicts. The author describes the attempt to verify any of those models with the chirality module of the ROSETTA mission, a probe built and launched with the mission to land on a comet and analyse whether there are chiral organic compounds that could have been brought to the Earth by cometary impacts. A truly interdisciplinary astrobology book, 'Amino Acids and the Asymmetry of Life', will fascinate students, researchers and all readers with backgrounds in natural sciences. With a foreword by Henri B. Kagan.

Download/Website: <http://www.unice.fr/lcmba/aromes>

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5 As seen on astro-ph

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

Exoplanets

- astro-ph/0807.0006: **Transit Detection of Radial Velocity Planets** by *Stephen R. Kane, Kaspar von Braun*
- astro-ph/0807.0096: **Transiting Planets - Lightcurve Analysis for Eccentric Orbits** by *David M. Kipping*
- astro-ph/0807.0469: **SuperLupus: A Deep, Long Duration Transit Survey** by *Daniel D. R. Bayliss, Penny D. Sackett & David T. F. Weldrake*
- astro-ph/0807.0625: **Type II Migration: Varying Planet Mass and Disc Viscosity** by *Richard G. Edgar*
- astro-ph/0807.0680: **Tides and the Evolution of Planetary Habitability** by *Rory Barnes, Sean N. Raymond, Brian Jackson et al*
- astro-ph/0807.0835: **Long-Term Evolution in Transit Duration of Extrasolar Planets from Magnetic Activity in their Parent Stars** by *Abraham Loeb*
- astro-ph/0807.1000: **Searching for transit timing variations in transiting exoplanet systems** by *Marie Hrudkova, Ian Skillen, Chris Benn et al*
- astro-ph/0807.1318: **Determination of stellar, orbital and planetary parameters using complete Monte-Carlo analysis – the case of HAT-P-7b** by *Philip Nutzman, David Charbonneau & Joshua N. Winn et al*
- astro-ph/0807.1530: **Determination of stellar, orbital and planetary parameters using complete Monte-Carlo analysis – the case of HAT-P-7b** by *Andras Pal, Gaspar A. Bakos, Robert W. Noyes et al*
- astro-ph/0807.1794: **Cloudy Atmosphere of the Extra-solar Planet HD189733b : A Possible Explanation of the Detected B-band Polarization** by *Sujan Sengupta*
- astro-ph/0807.1885: **Evaporation of extrasolar planets** by *David Ehrenreich*
- astro-ph/0807.1928: **Towards the Albedo of an Exoplanet: MOST Satellite Observations of Bright Transiting Exoplanetary Systems** by *Jason F. Rowe, Jaymie M. Matthews, Sara Seager et al*
- astro-ph/0807.2434: **Transits and secondary eclipses of HD 189733 with Spitzer** by *Eric Agol, Nicolas B. Cowan, James Bushong et al*

- astro-ph/0807.2353: **On the complementarity of astrometric and radial velocity exoplanet observations - Determining exoplanet mass with astrometric snapshots** by *M. Tuomi, S. Kotiranta & M. Kaasalainen*
- astro-ph/0807.2568: **Planetpol polarimetry of the exoplanet systems 55 Cnc and tau Boo** by *P.W.Lucas, J.H.Hough, J.A.Bailey et al*
- astro-ph/0807.2803: **Preliminary Results on HAT-P-4, TrES-3, XO-2, and GJ 436 from the NASA EPOXI Mission** by *Sarah Ballard, David Charbonneau, Michael F. A'Hearn et al*
- astro-ph/0807.2856: **Probing the Interiors of Very Hot Jupiters Using Transit Light Curves** by *Darin Ragozzine, Aaron S. Wolf*
- astro-ph/0807.3739: **Transiting exoplanets from the CoRoT space mission V. CoRoT-Exo-4b: Stellar and planetary parameters** by *C. Moutou, H. Bruntt, T. Guillot et al*
- astro-ph/0807.3767: **Transiting exoplanets from the CoRoT space mission IV: CoRoT-Exo-4b: A transiting planet in a 9.2 day synchronous orbit** by *S. Aigrain, A. Collier Cameron, M. Ollivier et al*
- astro-ph/0807.3889: **The Optical Gravitational Lensing Experiment. OGLE-III Photometric Maps of the Large Magellanic Cloud** by *A. Udalski I. Soszynski M.K. Szymanski et al*
- astro-ph/0807.4186: **Extrasolar Planet Eccentricities from Scattering in the Presence of Residual Gas Disks** by *Nickolas Moeckel, Sean N. Raymond, Philip J. Armitage*
- astro-ph/0807.4472: **Disk Truncation and Planet Formation in gamma Cephei** by *H. Jang-Condell, M. Mugaauer, T. Schmidt*
- astro-ph/0807.4828: **Searching for the secondary eclipse of CoRoT-Exo-2b and its transit timing variations** by *R. Alonso, S. Aigrain, F. Pont, et al.*

Disks

- astro-ph/0807.0146: **Discovery of a Circumbinary Disk around Herbig Ae/Be system v892 Tau** by *J. D. Monnier, A. Tannirkulam, P. G. Tuthill et al*
- astro-ph/0807.1134: **Variations on Debris Disks: Icy Planet Formation at 30-150 AU for 1-3 Solar Mass Main Sequence Stars** by *Scott J. Kenyon & Benjamin C. Bromley*
- astro-ph/0807.1766: **The HD 163296 Circumstellar Disk in Scattered Light: Evidence of Time-Variable Self-Shadowing** by *John P. Wisniewski, Mark Clampin, Carol A. Grady et al*
- astro-ph/0807.2291: **Confirmation of a gapped primordial disk around LkCa 15** by *Catherine Espaillat, Nuria Calvet, Kevin L. Luhman et al*
- astro-ph/0807.2856: **Probing the Interiors of Very Hot Jupiters Using Transit Light Curves** by *Darin Ragozzine & Aaron S. Wolf*
- astro-ph/0807.3328: **Color Gradients Detected in the HD 15115 Circumstellar Disk** by *J.H. Debes, A.J. Weinberger & I. Song*
- astro-ph/0807.3957: **New M dwarf debris disk candidates in NGC 2547** by *Jan Forbrich, Charles J. Lada, August A. Muench et al*

Instrumentation and Techniques

- astro-ph/0807.0694: **Prototyping coronagraphs for exoplanet characterization with SPHERE** by *Anthony Boccaletti, Lyu Abe, Jacques Baudrand et al*
- astro-ph/0807.0697: **End to End Simulation of AO-assisted coronagraphic differential imaging: estimation of performance for SPHERE** by *Anthony Boccaletti, Marcel Carbillet, Thierry Fusco, et al*
- astro-ph/0807.0705: **The Impact of Transiting Planet Science on the Next Generation of Direct-Imaging Planet Searches** by *Joseph C. Carson*
- astro-ph/0807.1915: **Theory and laboratory tests of the multi-stage phase mask coronagraph** by *P. Baudoz, R. Galicher, J. Baudrand et al*
- astro-ph/0807.1930: **Astrometric Detection of exo-Earths in the Presence of Stellar Noise** by *Joseph Catanzarite, Nicholas Law & Michael Shao*

- astro-ph/0807.2467: **Wavefront error correction and Earth-like planet detection by Self-Coherent Camera in space** by *R. Galicher, P. Baudoz & G. Rousset*
- astro-ph/0807.2741: **Prospects of long-time-series observations from Dome C for transit search** by *Heike Rauer, Thomas Fruth & Anders Erikson*
- astro-ph/0807.3915: **UTM, a universal simulator for lightcurves of transiting systems** by *Hans J. Deeg*
- astro-ph/0807.4844: **TEST - The Tautenburg Exoplanet Search Telescope** by *Philipp Eigmüller, Jochen Eislöffel*
- astro-ph/0807.4929: **Measuring accurate transit parameters** by *Joshua N. Winn*