ExoPlanet News An Electronic Newsletter

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1 Editorial

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

This newsletter covers a wide range of related research topics, ranging from discoveries and observations of exoplanets, protostellar disks, theoretical simulations of planet formation, exoplanet atmospheres and interiors, comparative planetology, formation and dynamics of planetary systems, planetary evolution and habitability, instrumentation, techniques and missions, origin and evolution of life on terrestrial planets, co-evolution of life, atmospheres and climate, characterisation of terrestrial planets and detection of biomarkers. Past editions, submission templates and other information can be found at the ExoPlanet News website: http://exoplanet.open.ac.uk

We are pleased by the number of you who have e-mailed asking to be added to the distribution list – the Newsletter is now circulated to 885 subscribers around the world. We do however rely on you, the subscribers of the newsletter, to send us your abstracts of recent papers, conference announcements, thesis abstracts, job adverts etc. 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. Please let us know of anything else you would like to see appear in the Newsletter.

Best wishes Glenn White & Andrew Norton

2 Abstracts of refereed papers

Retired A Stars and Their Companions II: Jovian planets orbiting kappa Coronae Borealis and HD167042

John Asher Johnson^{1,2}, Geoffrey W. Marcy², Debra A. Fischer³, Jason T. Wright², Sabine Reffert⁴, Julia M. Kregenow², Peter K. G. Williams², Kathryn M. G. Peek²

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Astrophysical Journal, in press

We report precise Doppler measurements of two evolved stars, kappa CrB (HD142091) and HD 167042, obtained at Lick Observatory as part of our search for planets orbiting intermediate-mass subgiants. Periodic variations in the radial velocities of both stars reveal the presence of substellar orbital companions. These two stars are notably massive with stellar masses of 1.80 Msun and 1.64 Msun, indicating that they are former A-type dwarfs that have evolved off of the main sequence and are now K-type subgiants. The planet orbiting kappa CrB has a minimum mass Msini = 1.8 Mjup, eccentricity e = 0.146 and a 1208 day period, corresponding to a semimajor axis of 2.7 AU. The planet around HD167042 has a minimum mass Msini = 1.7 Mjup and a 412.6 day orbit, corresponding to a semimajor axis of 1.3 AU. The eccentricity of HD167042b is consistent with circular (e = 0.027+/-0.04), adding to the rare class of known exoplanets in long-period, circular orbits similar to the Solar System gas giants. Like all of the planets previously discovered around evolved A stars, kappa CrBb and HD167042b orbit beyond 0.8 AU.

Download/Website: http://arxiv.org/abs/0711.4367

Contact: johnjohn@ifa.hawaii.edu

SuperWASP-N Extra-solar Planet Candidates from fields 06hr < RA < 16hr

Kane, S.R.^{1,2}, Clarkson, W.I.^{4,9}, West, R.G.⁸, Wilson, D.M.⁵, Christian, D.J.³, Collier Cameron, A.¹, Enoch, B.⁴, Lister, T.A.^{1,5,11}, Street, R.A.^{3,11}, Evans, A.⁵, Fitzsimmons, A.³, Haswell, C.A.⁴, Hellier, C.⁵, Hodgkin, S.T.⁶, Horne, K.¹, Irwin, J.⁶, Keenan, F.P.³, Norton, A.J.⁴, Osborne, J.⁸, Parley, N.R.⁴, Pollacco, D.L.³, Ryans, R.³, Skillen, I.⁷, Wheatley, P.J.¹⁰

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Monthly Notices of the Royal Astronomical Society, in press (arXiv:0711.2581)

The Wide Angle Search for Planets (WASP) survey currently operates two installations, designated SuperWASP-N and SuperWASP-S, located in the northern and southern hemispheres respectively. These installations are designed to provide high time-resolution photometry for the purpose of detecting transiting extra-solar planets, asteroids, and transient events. Here we present results from a transit-hunting observing campaign using SuperWASP-N covering a right ascension range of 06hr < RA < 16hr. This paper represents the fifth and final in the series of transit candidates released from the 2004 observing season. In total, 729,335 stars from 33 fields were monitored with 130,566 having sufficient precision to be scanned for transit signatures. Using a robust transit detection algorithm and selection criteria, 6 stars were found to have events consistent with the signature of a transiting extra-solar planet based upon the photometry, including the known transiting planet XO-1b. These transit candidates are presented here along with discussion of follow-up observations and the expected number of candidates in relation to the overall observing strategy.

Download/Website: http://arxiv.org/abs/0711.2581

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Influence of the evolving stellar X-ray luminosity distribution on exoplanetary mass loss

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Astronomy & Astrophysics, in press (DOI: 10.1051/0004-6361:20078364)

Aims: We investigate the influence of high–energy stellar radiation at close–in orbits on atmospheric mass loss during the stellar evolution of a G–type star.

Methods: High–energy stellar luminosity varies over a wide range for G field stars. The X–ray luminosity distributions from the Pleiades, the Hyades, and the field are used to derive a scaling law for the evolution of the stellar X–ray luminosity distribution. A modified energy–limited escape approach is taken for calculating atmospheric mass loss for a broad range of planetary parameters.

Results: We show that the evolution of close–in exoplanets strongly depends on the detailed X–ray luminosity history of their host stars, which varies over several orders–of–magnitude for G stars. Stars located in the high–energy tail of the luminosity distribution can evaporate most of its planets within 0.5 AU, while a significant fraction of

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planets can survive if exposed to a moderate X-ray luminosity. We show the change on an initial planetary mass distribution caused by atmospheric escape.

Download/Website: http://arxiv.org/abs/0710.3534

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OGLE-TR-211 – a new transiting inflated hot Jupiter from the OGLE survey and ESO LP666 spectroscopic follow-up program

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Astronomy & Astrophysics, submitted (arXiv:0711.3978)

We present results of the photometric campaign for planetary and low-luminosity object transits conducted by the OGLE survey in 2005 season (Campaign #5). About twenty most promising candidates discovered in these data were subsequently verified spectroscopically with the VLT/FLAMES spectrograph.

One of the candidates, OGLE-TR-211, reveals clear changes of radial velocity with small amplitude of 82 m/sec, varying in phase with photometric transit ephemeris. Thus, we confirm the planetary nature of the OGLE-TR-211 system. Follow-up precise photometry of OGLE-TR-211 with VLT/FORS together with radial velocity spectroscopy supplemented with high resolution, high S/N VLT/UVES spectra allowed us to derive parameters of the planet and host star. OGLE-TR-211b is a hot Jupiter orbiting a F7-8 spectral type dwarf star with the period of 3.68 days. The mass of the planet is equal to $1.03 \pm 0.20 M_{Jup}$ while its radius $1.36 \substack{+0.18 \\ -0.09} R_{Jup}$. The radius is about 20% larger than the typical radius of hot Jupiters of similar mass. OGLE-TR-211b is, then, another example of inflated hot Jupiters – a small group of seven exoplanets with large radii and unusually small densities – objects being a challenge to the current models of exoplanets.

Download/Website: http://arXiv.org/abs/astro-ph/0711.3978

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3 Other abstracts

Planets around massive subgiants

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"Extreme Solar Systems", ASP Conference Series, in press

Compared to planets around Sun-like stars, relatively little is known about the occurrence rate and orbital properties of planets around stars more massive than 1.3 Msun. The apparent deficit of planets around massive stars is due to a strong selection bias against early-type dwarfs in Doppler-based planet searches. One method to circumvent the difficulties inherent to massive main–sequence stars is to instead observe them after they have evolved onto the subgiant branch. We show how the cooler atmospheres and slower rotation velocities of subgiants make them ideal proxies for F- and A-type stars in Doppler-based planet searches. We present the early results from our planet search that reveal a paucity of planets orbiting within 1 AU of stars more massive than 1.5 Msun, and evidence of a rising trend in giant planet occurrence with stellar mass.

Download/Website: http://arxiv.org/abs/0710.2904

Contact: johnjohn@ifa.hawaii.edu

4 Conference announcements

Les Houches School announcement

T. Montmerle, A.-M. Lagrange Laboratoire d'Astrophysique de Grenoble, France

Winter School announcement,

The "Laboratoire d'Astrophysique de Grenoble" (LAOG) is organizing next February a 2-week winter school in Les Houches, near Chamonix in the French Alps, entitled "Physics and Astrophysics of Planetary Systems". The rapidly increasing number of extrasolar planets detected (more than 250) and the extreme diversity of their

known properties (mass, orbits, distribution, metallicities, etc.) shows that our Solar System is anything but typical of planetary systems. This diversity enables an access both to the different stages of the planet formation processes and to a large range of physical conditions prevailing in the evolution of different planetary systems. This includes the evolution of gaseous and dusty circumstellar disks, the migration and accretion phases, or phases corresponding in the Solar System to the primitive Solar nebula and the forming Earth (early atmosphere and oceans).

Our thread is therefore a global approach towards the physical processes governing the formation and evolution of planetary systems, including the Solar System and "lessons learned" from it, up to the first steps towards life. Observations, instrumentation, and, whenever possible, laboratory experiments, are part of this approach.

The audience targeted by the school consists mainly of PhD students, post-docs, and also researchers seeking a complementary culture, or even evolving towards new research topics. In the well-established "Les Houches School of Physics" tradition, we have chosen a 2-week duration to allow a wide coverage of the scientific topics, as well as ample time for discussions.

Download/Website: http://www-laog.obs.ujf-grenoble.fr/heberges/Houches08/index.htm

Contact: houchesplanets@ujf-grenoble.fr

Astrobiology Society of Britain Conference

M. Burchell University of Kent, UK

Conference announcement, July 1st – 4th 2008

The Astrobiology Society of Britain will be holding its 3rd conference on July 1 - 4, 2008. The conference is being organised by Prof. Mark Brake of Univ. Glamorgan and will be jointly hosted by Univ. of Glamorgan and Univ. of Cardiff in Cardiff. Details of the society and the meeting can be found at http://www.astrobiologysociety.org/ For further details contact lpullen@glam.ac.uk and include Astrobiology 2008 in your email header.

Download/Website: http://www.astrobiologysociety.org/

Contact: lpullen@glam.ac.uk

Darwin/TPF conference – postponement

Y. Rabbia¹, E.Covino²
 ¹ Observatoire de la Cote d'Azur, Dpt GEMINI, UMR CNRS 6203, Av Copernic, 06130 Grasse, France
 ² Osservatorio Capo di Monte. Napoli, Italy

Conference postponement,

In order to properly focus the objectives of the Conference, taking into proper consideration the ESA decisions within the Cosmic Vision 2015-2025 plan, the SOC and the LOC decided to postpone this conference. New dates will be in Spring 2009 and shall be announced in due time. Note that 2009 will be the 200th birthday of Charles Darwin and the 150th anniversary of his publishing his master book, The origin of species.

Contact: rabbia@obs-azur.fr

5 Jobs and positions

ESA Research Fellowships in Space Science

Exoplanet Research with CoRoT with Dr. Malcolm Fridlund

The European Space Agency awards several postdoctoral fellowships each year. The aim of these fellowships is to provide young scientists, holding a PhD or the equivalent degree, with the means of performing space science research in fields related to the ESA Science Programme. Areas of research include planetary science, astronomy and astrophysics, solar and solar-terrestrial science, plasma physics and fundamental physics. The fellowships are tenable at the European Space Research and Technology Centre (ESTEC) in Noordwijk, Netherlands, or at the European Space Astronomy Centre (ESAC) in Villafranca del Castillo, near Madrid, Spain.

Applications are now solicited for fellowships in space science to begin in the summer or fall of 2008. Preference will be given to applications submitted by candidates within five years of receiving their PhD. Candidates not holding a PhD yet are encouraged to apply, but they must provide evidence of receiving their degree before starting the fellowship.

The deadline for applications is 21 January 2008.

More information on the ESA Research Fellowship programme in Space Science, on the conditions and eligibility, as well as the application form can be found on the world-wide web at this address: http://www.rssd.esa.int/fellowship

Questions on the scientific aspects of the ESA Fellowship Programme in Space Science not answered in the above pages can be sent by e-mail to the fellowship coordinator, Guido De Marchi, at the address fellowship@rssd.esa.int

Download/Website: http://www.rssd.esa.int/fellowship

Contact: fellowship@rssd.esa.int

Lectureship in Physics

Department of Physics and Astronomy, The Open University, Walton Hall, Milton Keynes MK7 6AA, U.K.

Job Ref.: 3700, Salary range: £33,739 – £40,335

You will hold a physics-related PhD, or have equivalent experience, and have a good research record together with the potential for teaching physics at undergraduate and postgraduate levels. See http://physics.open.ac.uk/ for details of current teaching and research.

This lectureship is associated with the teaching of our core physics curriculum; an ability to contribute also to specialist courses in physics or astronomy would be an advantage. This position is primarily, though not exclusively, associated with physics-based research. You will have research interests that fit into one of the existing groups or else will build cross-links between them from an independent base. The research programme must be internationally competitive and matched to external funding opportunities.

For detailed information and how to apply go to http://www3.open.ac.uk/employment, call the Recruitment Coordinator on +44(0)1908 655229 or email t.j.moore@open.ac.uk quoting the reference number 3700. Closing date: 21 December 2007. Interview date: 31 January 2008.

Disabled applicants who meet the essential job requirements will be interviewed. Further particulars are available in large print, disk or audiotape (minicom +44(0)1908 654901).

We promote diversity in employment and welcome applications from all sections of the community.

Download/Website: http://www3.open.ac.uk/employment

Contact: T.J.Moore@open.ac.uk

6 As seen on astro-ph

The following list contains all the entries relating to exoplanets that we spotted on astro-ph during November 2007. If you spot any that we missed, let us know and we'll include them in the next issue.

Exoplanets

- arXiv:0710.5918: Characterization of the long-period companions of the exoplanet host stars: HD196885, HD1237 and HD27442 by Chauvin, G. et al.
- arXiv:0711.0126: WASP-3b: a strongly-irradiated transiting gas-giant planet by Pollacco, D. et al.
- arXiv:0711.0500: A search for transiting extrasolar planet candidates in the OGLE-II microlens database of the galactic plane by *Snellen, I. et al.*
- arXiv:0711.0782: Extreme Habitability: Formation of Habitable Planets in Systems with Close-in Giant Planets and/or Stellar Companions by *Haghighipour*, *Nader*
- arXiv:0711.0842: An accurate distance to 2M1207Ab by Ducourant, C. et al.
- arXiv:0711.0984: Secular Evolution of Planetary Systems in Binaries by Takeda, Genya et al.
- arXiv:0711.1432: Exoplanet HD209458b: inflated hydrogen atmosphere but no sign of evaporation by *Ben-Jaffel, Lotfi*

- arXiv:0711.1614: Microlensing Searches for Planets: Results and Future Prospects by Gaudi, B. Scott
- arXiv:0711.1746: Lupus-TR-3b: A Low-Mass Transiting Hot Jupiter in the Galactic Plane? by Weldrake, David T. F. et al.
- arXiv:0711.1801: Tidal dynamics of extended bodies in planetary systems and multiple stars by Mathis, Stephane; Le Poncin-Lafitte, Christophe
- arXiv:0711.1888: Five New Transits of the Super-Neptune HD 149026 by Winn, Joshua N. et al.
- arXiv:0711.1985: Five or six step scenario for evolution? by Carter, Brandon
- arXiv:0711.2015: Observable Consequences of Planet Formation Models in Systems with Close-in Terrestrial Planets by Raymond, Sean N.; Barnes, Rory; Mandell, Avi M.
- arXiv:0711.2106: **Hydrodynamic Simulations of Unevenly Irradiated Jovian Planets** by *Langton, Jonathan; Laughlin, Gregory*
- arXiv:0711.2111: Warm dust in the terrestrial planet zone of a sun-like Pleiad: collisions between planetary embryos? by Langton, Jonathan; Laughlin, Gregory
- arXiv:0711.2142: **Primary transit of the planet HD189733b at 3.6 and 5.8 microns** by *Beaulieu, J. P.; Carey, S.; Ribas, I. et al.*
- arXiv:0711.2304: A Technique for Detecting Starlight Scattered from Transiting Extrasolar Planets with Application to HD 209458b by *Xin Li et al.*
- arXiv:0711.2508: Finding Planets Around White Dwarf Remnants of Massive Stars by Andrew Gould, Mukremin Kilic
- arXiv:0711.2581: SuperWASP-N Extra-solar Planet Candidates from Fields 06hr < RA < 16hr by Kane, S. R. et al.
- arXiv:0711.3343: HD196885, a close binary star with a 3.7-year planet by Correia, A. C. M. et al.
- arXiv:0711.3601: Growing and moving low-mass planets in non-isothermal disks by Paardekooper, S. -J.; Mellema, G.
- arXiv:0711.3730: Cloud formation in giant planets by Helling, Christiane
- arXiv:0711.3978: OGLE-TR-211 a new transiting inflated hot Jupiter from the OGLE survey and ESO LP666 spectroscopic follow-up program by Udalski, A.; Pont, F.; Naef, D. et al.
- arXiv:0711.4059: Planets in the Galactic Bulge: Results from the SWEEPS Project by Sahu, Kailash C.; Casertano, Stefano; Valenti, Jeff et al.
- arXiv:0711.4111: The Very Low Albedo of an Extrasolar Planet: MOST Spacebased Photometry of HD 209458 by Jason F. Rowe et al.
- arXiv:0711.4367: Retired A Stars and Their Companions II: Jovian planets orbiting kappa Coronae Borealis and HD167042 by Johnson, John A. et al.
- arXiv:0711.4750: Microlensing search for extrasolar planets: observational strategy, discoveries and implications by Cassan, Arnaud; Sumi, Takahiro; Kubas, Daniel
- arXiv:0711.4901: Observational Tests of Planet Formation Models by A. Sozzetti et al.
- arXiv:0711.4903: Testing Planet Formation Models with Gaia µas Astrometry by A. Sozzetti et al.

Debris Disks

- arXiv:0711.2090: Dynamics of charged dust particles in protoplanetary discs by Shadmehri, Mohsen
- arXiv:0711.2148: The Physics of Protoplanetesimal Dust Agglomerates II. Low Velocity Collision Properties by Langkowski, Doreen; Teiser, Jens; Blum, Juergen
- arXiv:0711.2192: Coagulation, fragmentation and radial motion of solid particles in protoplanetary disks by *Brauer, F.; Dullemond, C. P.; Henning, Th.*
- arXiv:0711.2595: Effects of photophoresis on the evolution of transitional circumstellar disks by *Herrmann, Fabian; Krivov, Alexander V.*
- arXiv:0711.4561: Debris Disks Around Nearby Stars with Circumstellar Gas by Roberge, Aki; Weinberger, Alycia J.

Instrumentation & Techniques

- arXiv:0711.0099: Detection of faint companions through stochastic speckle discrimination by *Gladysz, Szymon; Christou, Julian C.*
- arXiv:0711.2344: Building Giant-Planet Cores at a Planet Trap by Alessandro Morbidelli et al.
- arXiv:0711.4256: **Observational Window Functions in Planet Transit Searches** by *Kaspar von Braun, David R. Ciardi*