ExoPlanet News
An Electronic Newsletter

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1 Editorial

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

Clearly March has been a fairly lean month for exoplanet research – the astro-ph list is somewhat shorter than it has been in previous months, and we have had relatively few abstracts submitted to the newsletter. To make up for this we have two announcements in this month's newlstter: (1) an update from Vincent Coudé du Foresto about the Blue Dots team and (2) a press release from the SuperWASP project announcing the discovery of 10 new transiting exoplanets.

Remember that past editions of the 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

2 Abstracts of refereed papers

CHARA Array Measurements of the Angular Diameters of Exoplanet Host Stars

E. K. Baines[1], *H. A. McAlister*[1], *T. A. ten Brummelaar*[1], *N. H. Turner*[1], *J. Sturmann*[1], *L. Sturmann*[1], *P. J. Goldfinger*[1], *S. T. Ridgway*[2]

[1] Center for High Angular Resolution Astronomy, Georgia State University, P.O. Box 3969, Atlanta, GA 30302-3969
[2] Kitt Peak National Observatory, National Optical Astronomy Observatory, P.O. Box 26732, Tucson, AZ 85726-6732

Astrophysical Journal, in press/published (ADS-Bibcode/arXiv:0803.1411v1)

We have measured the angular diameters for a sample of 24 exoplanet host stars using Georgia State University's CHARA Array interferometer. We use these improved angular diameters together with *Hipparcos* parallax measurements to derive linear radii and to estimate the stars' evolutionary states.

Download/Website: `http://arxiv.org/abs/0803.1411`

Contact: `baines@chara.gsu.edu`

The Search for Stellar Companions to Exoplanet Host Stars Using the CHARA Array

E. K. Baines[1], *H. A. McAlister*[1], *T. A. ten Brummelaar*[1], *N. H. Turner*[1], *J. Sturmann*[1], *L. Sturmann*[1], *S. T. Ridgway*[2]

[1] Center for High Angular Resolution Astronomy, Georgia State University, P.O. Box 3969, Atlanta, GA 30302-3969
[2] Kitt Peak National Observatory, National Optical Astronomy Observatory, P.O. Box 26732, Tucson, AZ 85726-6732

Astrophysical Journal, in press/published (ADS-Bibcode/arXiv:0803.4131v1)

Most exoplanets have been discovered via radial velocity studies, which are inherently insensitive to orbital inclination. Interferometric observations will show evidence of a stellar companion if it sufficiently bright, regardless of the inclination. Using the CHARA Array, we observed 22 exoplanet host stars to search for stellar companions in low-inclination orbits that may be masquerading as planetary systems. While no definitive stellar companions were discovered, it was possible to rule out certain secondary spectral types for each exoplanet system observed by studying the errors in the diameter fit to calibrated visibilities and by searching for separated fringe packets.

Download/Website: `http://arxiv.org/abs/0803.4131`

Contact: `baines@chara.gsu.edu`

Inverting Phase Functions to Map Exoplanets

N. Cowan & E. Agol

Astronomy Department, University of Washington, Box 351580, Seattle, WA 98195

Astrophysical Journal Letters, in press (astro-ph 0803.3622)

We describe how to generate a longitudinal brightness map for a tidally locked exoplanet from its phase function light curve. We operate under a number of simplifying assumptions, neglecting limb darkening/brightening, star spots, detector ramps, as well as time-variability over a single planetary rotation. We develop the transformation from a planetary brightness map to a phase function light curve and simplify the expression for the case of an edge-on system. We introduce two models—composed of longitudinal slices of uniform brightness, and sinusoidally varying maps, respectively—which greatly simplify the transformation from map to light curve. We discuss numerical approaches to extracting a longitudinal map from a phase function light curve, explaining how to estimate the uncertainty in a computed map and how to choose an appropriate number of fit parameters. We demonstrate these techniques on a simulated map and discuss the uses and limitations of longitudinal maps. The sinusoidal model

provides a better fit to the planet's underlying brightness map, although the slice model is more appropriate for light curves which only span a fraction of the planet's orbit. Regardless of which model is used, we find that there is a maximum of ~ 5 free parameters which can be meaningfully fit based on a full phase function light curve, due to the insensitivity of the latter to certain modes of the map. This is sufficient to determine the longitudes of primary equatorial hot-spots and cold-spots, as well as the presence of secondary maxima/minima.

Download/Website: `http://arxiv.org/abs/0803.3622`

Contact: `cowan@astro.washington.edu`

3 Announcements

Update on the Blue Dots initiative

Vincent Coudé du Foresto

Announcement, Update

Response to the initial Blue Dots announcement (see Exoplanet newsletter of last Feb. 1st) has been enthousiastic (almost 200 expressions of interest), and this only shows that the time is ripe for such a community effort to formulate a strategy towards the detection and characterization of habitable exoplanets. There is now an (almost final) list of coordinators (see below), who will constitute their expert groups over the next few weeks – feel free to contact the ones closest to your area of interest.
What's happening next? We will collect suggestions on possible observational facilities (space missions, ground based instruments, and other types of projects) that could realize the Blue Dots goal. There will be a corresponding call for proposals before this summer. We will process this information and integrate it into a road map between this autumn and the summer of 2009. An international conference (tentatively scheduled for 14-18 September 2009, location TBD) will be held to present and discuss the results. We therefore hope to present a consolidated approach during the next round of ESA's Cosmic Vision process, planned for 2010.
Finally, a Web site is in the works as a collaborative tool to collect and disseminate information. Stay in tune for more details.

List of expert group coordinators:

Planetary characterization:
Targets and their environments: Ignasi Ribas (iribas@ieec.uab.es)
Formation and evolution of planetary systems: Hans Zinnecker (hzinnecker@aip.de)
Modelling habitable planets: Franck Selsis (franck.selsis@obs.u-bordeaux1.fr)
Habitability criteria: Charles Cockell (C.S.Cockell@open.ac.uk)
Observations of planetary atmospheres: Giovanna Tinetti (ucapgti@ucl.ac.uk)

Detection techniques:
Radial velocity: Nuno Santos (nuno@astro.up.pt)
Single aperture imaging: Anthony Boccaletti (anthony.boccaletti@obspm.fr)
Multiple aperture imaging: Marc Ollivier (marc.ollivier@ias.u-psud.fr)
Microlensing: Jean-Philippe Beaulieu (beaulieu@iap.fr)
Astrometry: Damien Segransan (damien.segransan@obs.unige.ch)
Transits: Alessandro Sozzeti (sozzetti@oato.inaf.it)

Others:
Public outreach and education: Ewa Szuszkiewicz (szusz@univ.szczecin.pl)
European networking and funding search: Helmut Lammer (helmut.lammer@oeaw.ac.at)
Interface with the industry: Christoph Keller (C.U.Keller@astro.uu.nl)
ESO contact point: Gerard van Belle (gerard.van.belle@eso.org)
JPL's ExoPlanet Exploration Program representative: Chas Beichman (chas@pop.jpl.nasa.gov)
JAXA contact point: Hiroshi Shibai (shibai@nagoya-u.jp)
Russia / Eastern Europe contact point: Maxim Khodachenko (maxim.khodachenko@oeaw.ac.at)
Contact point for India: Abhijit Chakraborty (abhijit@prl.res.in)
Contact point for China: TBD

Contact: vincent.foresto@obspm.fr

The (Super)WASP factory finds 10 new planets in the last 6 months

Press Release on behalf of the SuperWASP project
The Royal Astronomical Society

Press Release, Tuesday 1st April 2008

In the last 6 months an international team of astronomers have used two batteries of cameras, one in the Canary Islands and one in South Africa, to discover 10 new planets in orbit around other stars (commonly known as extra-solar planets). The results from the Wide Area Search for Planets (SuperWASP) will be announced by team member Dr Don Pollacco of Queen's University Belfast, in his talk at the RAS National Astronomy Meeting (NAM 2008) on Tuesday 1 April.
Scientists have found more than 270 extrasolar planets since the first one was discovered in the early 1990s. Most of these are detected through their gravitational influence on the star they orbit – as it moves the planet pulls on the star, tugging it back and forth. However, making these discoveries depends on looking at each star over a period of weeks or months and so the pace of discovery is fairly slow.
SuperWASP uses a different method. The two sets of cameras watch for events known as transits, where a planet passes directly in front of a star and blocks out some of the star's light, so from the Earth the star temporarily appears a little fainter. The SuperWASP cameras work as robots, surveying a large area of the sky at once and each night astronomers have data from millions of stars that they can check for transits and hence planets. The transit method also allows scientists to deduce the size and mass of each planet.
Each possible planet found using SuperWASP is then observed by astronomers working at the Nordic Optical Telescope on La Palma, the Swiss Euler Telescope in Chile and the Observatoire de Haute Provence in southern France, who use precision instruments to confirm or reject the discovery.
45 planets have now been discovered using the transit method, and since they started operation in 2004 the Super-WASP cameras have found 15 of them – making them by far the most successful discovery instruments in the world. The SuperWASP planets have masses between a middleweight 0.5 and a huge 8.3 times that of Jupiter, the largest planet in our Solar System. A number of these new worlds are quite exotic. For example, a year on WASP-12B (its orbital period) is just 1.1 days. The planet is so close to its star that its daytime temperature could reach a searing 2300 degrees Celsius.
Dr Pollacco is delighted with the results. "SuperWASP is now a planet-finding production line and will revolutionise the detection of large planets and our understanding of how they were formed. It's a great triumph for European astronomers."

Notes for Editors
The SuperWASP cameras are operated by a consortium including the Isaac Newton Group on La Palma, the Instituto Astrofisica Canarias, the University of Keele, the University of Leicester, the Open University, Queen's University Belfast and St Andrew's University.
Follow up observations of SuperWASP exoplanet candidates are obtained at the Nordic Optical Telescope on La Palma, the Swiss Euler Telescope at La Silla, Chile (in collaboration with colleagues at Geneva Observatory) and at the 1.93-m telescope of the Observatoire de Haute-Provence in France (in collaboration with colleagues at the Institut d'Astrophysique de Paris and the Laboratoire d'Astrophysique de Marseille).
The SuperWASP cameras in La Palma and South Africa are operated with funding provided by the UK's Science and Technology Facilities Council (STFC).
The RAS National Astronomy Meeting (NAM 2008) is hosted by Queen's University Belfast. It is principally sponsored by the RAS and the STFC. NAM 2008 is being held together with the UK Solar Physics (UKSP) and Magnetosphere, Ionosphere and Solar-Terrestrial (MIST) spring meetings.

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

4 As seen on astro-ph

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

Exoplanets

arXiv:0803.0026: **Tidal Heating of Extra-Solar Planets** by *Brian Jackson, Richard Greenberg & Rory Barnes*
arXiv:0803.0296: **HST FGS astrometry - the value of fractional millisecond of arc precision** by *G. Fritz Benedict, Barbara E. McArthur, Jacob L. Bean*
arXiv:0803.0746: **HAT-P-7b: An Extremely Hot Massive Planet Transiting a Bright Star in the Kepler Field** by *A. Pal et al.*
arXiv:0803.1411: **CHARA Array Measurements of the Angular Diameters of Exoplanet Host Stars** by *Ellyn K. Baines et al.*
arXiv:0803.1831: **New observations of the extended hydrogen exosphere of the extrasolar planet HD209458b** by *David Ehrenreich et al.*
arXiv:0803.1839: **Radiative Thrusters on Close-in Extrasolar Planets** by *Daniel Fabrycky*
arXiv:0803.2000: **On the formation and migration of giant planets in circumbinary discs** by *Arnaud Pierens & Richard P. Nelson*
arXiv:0803.2029: **The exoplanet-host star iota Horologii: an evaporated member of the primordial Hyades cluster** by *S. Vauclair et al.*
arXiv:0803.2240: **The Exo-planetary System of 55 Cancri and the Titius-Bode Law** by *Arcadio Poveda & Patricia Lara*
arXiv:0803.2935: **Orbital Dynamics Of A Second Planet In HD17156** by *Donald Short et al.*
arXiv:0803.3014: **Lithium abundances in exoplanet-hosts stars** by *M. Castro, S. Vauclair. O. Richard & N.C. Santos*
arXiv:0803.3202: **Transiting exoplanets from the CoRoT space mission I - CoRoT-Exo-1b: a low-density short-period planet around a G0V star** by *P. Barge et al.*
arXiv:0803.3207: **Transiting exoplanets from the CoRoT space mission II. CoRoT-Exo-2b: A transiting planet around an active G star** by *Alonso, R. et al.*
arXiv:0803.3209: **Transiting exoplanets from the CoRoT space mission III. The spectroscopic transit of CoRoT-Exo-2b with SOPHIE and HARPS** by *F. Bouchy et al.*

arXiv:0803.3357: **The Keck Planet Search: Detectability and the Minimum Mass and Orbital Period Distribution of Extrasolar Planets** by *Andrew Cumming et al.*
arXiv:0803.4004: **The Monitor project: the search for transits in the open cluster NGC 2362** by *Adam A. Miller et al.*
arXiv:0803.4131: **The Search for Stellar Companions to Exoplanet Host Stars Using the CHARA Array** by *Ellyn K. Baines et al.*
arXiv:0803.4143: **AsteroFLAG: first results from hare-and-hounds Exercise 1** by *W.J. Chaplin et al.*
arXiv:0803.4159: **Search for extrasolar planets with high-precision relative astrometry** by *T. Roell, A. Seifahrt, & R. Neuhauser*

Debris and Transition Disks

arXiv:0803.0773: **Further Constraints on the Presence of a Debris Disk in the Multiplanet System Gliese 876** by *Paul D. Shankland et al.*
arXiv:0803.1674: **Spitzer/MIPS Observations of Stars in the Beta Pictoris Moving Group** by *L. M. Rebull et al.*
arXiv:0803.2024: **The Disk Around CoKu Tau/4: Circumbinary, not Transitional** by *M.J. Ireland & A.L. Kraus*
arXiv:0803.3629: **The Solar-System-Scale Disk Around AB Aurigae** by *Ben R. Oppenheimer et al.*

Instrumentation and Techniques

arXiv:0803.0296: **Inverting Phase Functions to Map Exoplanets** by *Nicolas B. Cowan & Eric Agol*
arXiv:0803.3622: **HST FGS astrometry - the value of fractional millisecond of arc precision** by *G. Fritz Benedict, Barbara E. McArthur & Jacob L. Bean*