ExoPlanet News
An Electronic Newsletter

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Contents

1 Editorial

Welcome to edition 120 of the ExoPlanet News!

Thanks very much to all who contributed to this rather slim, but nonetheless exciting, edition of the exoplanet newsletter. Have a look and share with anyone who might be interested!
We would also like to draw your attention to the "Name an exoplanet" project initiated by the IAU that gives every country in the world the opportunity to name an exoplanet. While - maybe - not necessarily of major scientific importance to you, this might be an interesting item to mention during outreach events or other interaction with the general public. More information can be found here:

`https://www.iau.org/news/pressreleases/detail/iau1908/`

On the scientific side it is worth mentioning that Breakthrough Watch and the European Southern Observatory achieved "first light" on the upgraded VISIR instrument on Paranal to search for Earth-like planets in the alpha Centauri system. Details about the campaign can be found in the press release here:

`https://www.eso.org/public/news/eso1911/?lang`

Finally, in case you missed it, the JWST Cycle 1 proposal schedule is now finalized as annouced here:

`http://www.stsci.edu/contents/news/jwst/the-jwst-cycle-1-proposal-schedule-is-now-finalized`

The Latex template for submitting contributions, as well as all previous editions of ExoPlanet News, can be found on the ExoPlanet News webpage (http://nccr-planets.ch/exoplanetnews/). We are looking forward to your contributions!

The next issue of the ExoplanetNews will appear July 15, 2019.
Thanks for all your support and best regards from Switzerland,

Sascha P. Quanz
Christoph Mordasini
Yann Alibert
Adrien Leleu

2 Abstracts of refereed papers

Climate of an Ultra Hot Jupiter: Spectroscopic phase curve of WASP-18b with HST/WFC3

J. Arcangeli[1], J.-M. Désert[1], V. Parmentier[2], K. B. Stevenson[3], J. L. Bean[4], M. R. Line[5], Laura Kreidberg[6,7], Jonathan J Fortney[8], Adam P. Showman[9]

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[3] Space Telescope Science Institute, 3700 San Martin Drive, Baltimore, MD 21218, USA
[4] Department of Astronomy & Astrophysics, University of Chicago, 5640 S. Ellis Avenue, Chicago, IL 60637, USA
[5] School of Earth & Space Exploration, Arizona State University, Tempe, AZ 85287, USA
[6] Center for Astrophysics — Harvard and Smithsonian, Cambridge, MA 02138, USA
[7] Harvard Society of Fellows, 78 Mt. Auburn St., Cambridge, MA 02138
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Astronomy & Astrophysics, 2019A&A...625A.136A

We present the analysis of a full-orbit, spectroscopic phase curve of the ultra hot Jupiter WASP-18b, obtained with the Wide Field Camera 3 aboard the Hubble Space Telescope. We measure the planet's normalized day-night contrast as >0.96 in luminosity: the disk-integrated dayside emission from the planet is at 964 ± 25 ppm, corresponding to 2894 ± 30 K, and we place an upper limit on the nightside emission of <32ppm or 1430K at the 3σ level. We also find that the peak of the phase curve exhibits a small, but significant offset in brightness of 4.5 ± 0.5 degrees eastward.

We compare the extracted phase curve and phase resolved spectra to 3D Global Circulation Models and find that broadly the data can be well reproduced by some of these models. We find from this comparison several constraints on the atmospheric properties of the planet. Firstly we find that we need efficient drag to explain the very inefficient day-night re-circulation observed. We demonstrate that this drag could be due to Lorentz-force drag by a magnetic field as weak as 10 Gauss. Secondly, we show that a high metallicity is not required to match the large day-night temperature contrast. In fact, the effect of metallicity on the phase curve is different from cooler gas-giant counterparts, due to the high-temperature chemistry in WASP-18b's atmosphere. Additionally, we compare the current UHJ spectroscopic phase curves, WASP-18b and WASP-103b, and show that these two planets provide a consistent picture with remarkable similarities in their measured and inferred properties. However, key differences in these properties, such as their brightness offsets and radius anomalies, suggest that UHJ could be used to separate between competing theories for the inflation of gas-giant planets.

Download/Website: `https://arxiv.org/pdf/1904.02069.pdf`

Contact: `J.Arcangeli@uva.nl`

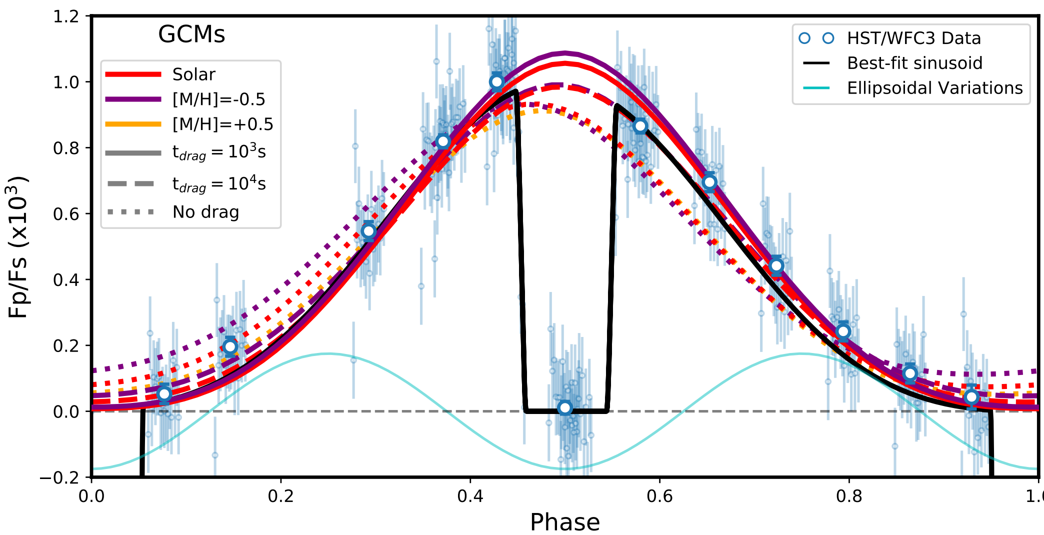

Figure 1: Systematics-corrected HST/WFC3 white-light phase curve of WASP-18b (blue points) compared to suite of Global Circulation Models (coloured curves). In black is the best-fit model used to parametrize the planet signal, with two sinusoidal components for the phase-curve variation. In cyan are the stellar ellipsoidal variations, that have been subtracted from the phase curve. GCMs shown are parametrized by 3 drag timescales indicated by line-styles and by 3 metallicities indicated by colours (-0.5, 0.0, and +0.5 relative to solar).

Transit least-squares survey – II. Discovery and validation of 17 new sub- to super-Earth-sized planets in multi-planet systems from *K2*

René Heller[1], *Michael Hippke*[2], *Kai Rodenbeck*[3,1]

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Astronomy & Astrophysics, in press (arXiv:1905.09038)

The extended *Kepler* mission (*K2*) has revealed more than 500 transiting planets in roughly 500 000 stellar light curves. All of these were found either with the `box least-squares` algorithm or by visual inspection. Here we use our new `transit least-squares` (`TLS`) algorithm to search for additional planets around all *K2* stars that are currently known to host at least one planet. We discover and statistically validate 17 new planets with radii ranging from about 0.7 Earth radii ($R_\oplus$) to roughly $2.2\,R_\oplus$ and a median radius of $1.18\,R_\oplus$. EPIC 201497682.03, with a radius of $0.692^{+0.059}_{-0.048}\,R_\oplus$, is the second smallest planet ever discovered with *K2*. The transit signatures of these 17 planets are typically 200 ppm deep (ranging from 100 ppm to 2000 ppm), and their orbital periods extend from about 0.7 d to 34 d with a median value of about 4 d. Fourteen of these 17 systems only had one known planet before, and they now join the growing number of multi-planet systems. Most stars in our sample have subsolar masses and radii. The small planetary radii in our sample are a direct result of the higher signal detection efficiency that `TLS` has compared to box-fitting algorithms in the shallow-transit regime. Our findings help in populating the period-radius diagram with small planets. Our discovery rate of about 3 % within the group of previously known *K2* systems suggests that `TLS` can find over 100 additional Earth-sized planets in the data of the *Kepler* primary mission.

Download/Website: `https://doi.org/10.1051/0004-6361/201935600`

Contact: `heller@mps.mpg.de`

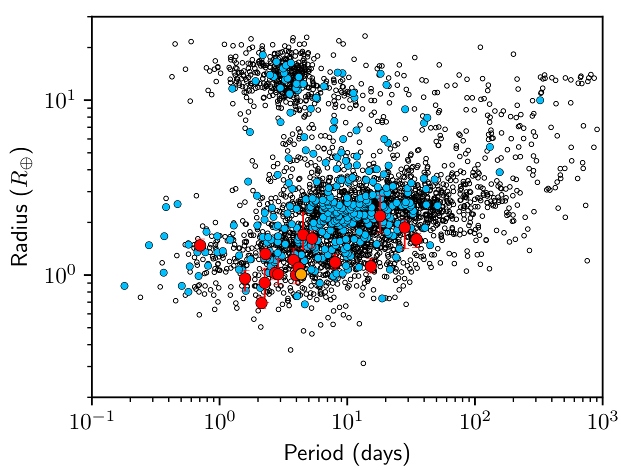

Figure 2: Period-radius diagram of all confirmed transiting exoplanets (empty circles) mostly from K1, candidates and confirmed planets from *K2* (blue), and from the `TLS` Survey (red), including K2-32 e (orange) presented in Heller, Rodenbeck, Hippke (2019). The uncertainties in the orbital periods of the 18 planets discovered and characterized in the `TLS` Survey are much smaller and shorter than the symbol size.

ISPY - NaCo Imaging Survey for Planets around Young stars Discovery of an M dwarf in the gap between HD 193571 and its debris ring

A. Musso Barcucci[1], *R. Launhardt*[1], *G. Kennedy*[2], *H. Avenhaus*[3], *S. Brems*[4], *R. van Boekel*[1], *A. Cheetham*[1,5], *G. Cugno*[6], *J. Girard*[7], *N. Godoy*[8,9], *Th. Henning*[1], *S. Metchev*[10], *A. Müller*[1], *J. Olofsson*[8,9], *F. Pepe*[5], *S. Quanz*[6], *A. Quirrenbach*[4], *S. Reffert*[4], *E. Rickman*[5], *M. Samland*[1], *D. Segransan*[5]

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[6] ETH Zürich, Institute for Particle Physics and Astrophysics, Wolfgang-Pauli-Str. 27, 8093 Zürich, Switzerland
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[8] Instituto de Fisica y Astronomia, Facultad de Ciencias, Universidad de Valparaiso, Valparaiso, Chile
[9] Núcleo Milenio Formación Planetaria - NPF, Universidad de Valparaiso, Valparaiso, Chile
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Astronomy & Astrophysics, in press (arXiv:1906.01391)

The interaction between low-mass companions and the debris discs they reside in is still not fully understood. A debris disc can evolve due to self-stirring, a process in which planetesimals can excite their neighbours to the point of destructive collisions. In addition, the presence of a companion could further stir the disc (companion-stirring). Additional information is necessary to understand this fundamental step in the formation and evolution of a planetary system, and at the moment of writing only a handful of systems are known where a companion and a debris disc have both been detected and studied at the same time. Our primary goal is to augment the sample of these systems and to understand the relative importance between self-stirring and companion-stirring. In the course of the VLT/NaCo Imaging Survey for Planets around Young stars (ISPY), we observed HD 193571, an A0 debris disc hosting star at a distance of 68 pc with an age between ∼60 and 170 Myr. We obtained two sets of observations in L' band and a third epoch in H band using the GPI instrument at Gemini-South. A companion was detected in all three epochs at a projected separation of ∼11 au (∼0.17"), and co-motion was confirmed through proper motion analysis. Given the inferred disc size of 120 au, the companion appears to reside within the gap between the host star and the disc. Comparison between the L' and H band magnitude and evolutionary tracks suggests a mass of $\sim 0.31 - 0.39\,M_{\odot}$. We discovered a previously unknown M-dwarf companion around HD 193571, making it the third low-mass stellar object discovered within a debris disc. A comparison to self- and companion-stirring models suggests that the companion is likely responsible for the stirring of the disc.

Download/Website: `https://arxiv.org/abs/1906.01391`

Contact: `musso@mpia.de`

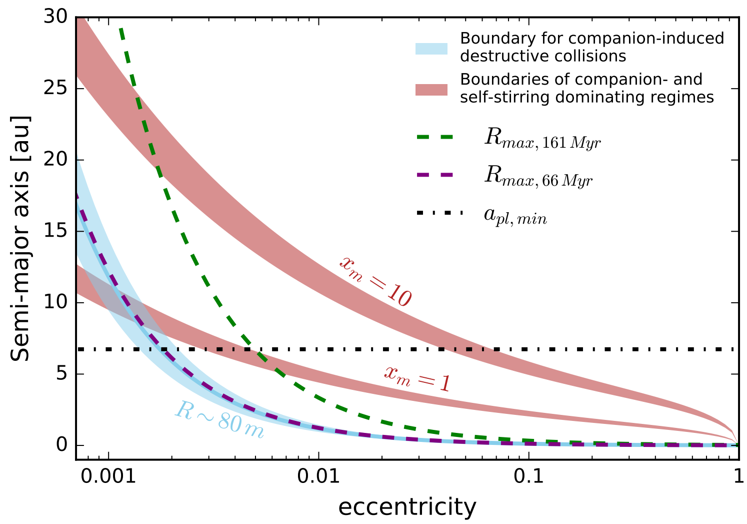

Figure 3: Boundaries between a self-stirring and companion-stirring dominated disc. The light blue lines mark the ($a_{\rm pl}$,$e_{\rm pl}$) parameter space in which the companion would be able to stir planetesimals of size R to destruction velocities at a distance of 120 au. The shaded area around the solid light blue ($R = 80$ m) line takes into account the errors on the disc size and the stellar mass. The dashed purple line shows the $R_{\rm max}$ for 66 Myr (close to the solid light blue line) and the dashed green line shows the $R_{\rm max}$ value for the 161 Myr case. The shaded red areas indicate the boundaries between the self-stirring and companion-stirring dominated cases, for a fixed distance and companion mass, and for two representative $x_{\rm m}$ values; accounting for errors on disc size, stellar mass, and companion mass (the areas encompass both age estimates). The horizontal dotted black line is the lowermost boundary of the minimum possible companion semi-major axis calculated in Section 3.3. The companion dominates the stirring process only for combinations of $a_{\rm pl}$ and $e_{\rm pl}$ lying above the light blue curve (the companion can stir planetesimals at the disc distance) and the red curve (the companion stirs the disc faster than the disc stirs itself).

On the 3D secular dynamics of RV-detected planetary systems

M. Volpi[1], *A. Roisin*[1], *A.-S. Libert*[1]
naXys, Department of Mathematics, University of Namur, Rempart de la Vierge 8, B-5000 Namur, Belgium

Astronomy & Astrophysics, in press (arXiv:1905.03722)

Aims. To date, more than 600 multi-planetary systems have been discovered. Due to the limitations of the detection methods, our knowledge of the systems is usually far from complete. In particular, for planetary systems discovered with the radial velocity (RV) technique, the inclinations of the orbital planes, and thus the mutual inclinations and planetary masses, are unknown. Our work aims to constrain the spatial configuration of several RV-detected extra-solar systems that are not in a mean-motion resonance.
Methods. Through an analytical study based on a first-order secular Hamiltonian expansion and numerical explorations performed with a chaos detector, we identified ranges of values for the orbital inclinations and the mutual inclinations, which ensure the long-term stability of the system. Our results were validated by comparison with n-body simulations, showing the accuracy of our analytical approach up to high mutual inclinations ($\sim 70°$-$80°$).
Results. We find that, given the current estimations for the parameters of the selected systems, long-term regular evolution of the spatial configurations is observed, for all the systems, i) at low mutual inclinations (typically less than $35°$) and ii) at higher mutual inclinations, preferentially if the system is in a Lidov-Kozai resonance. Indeed, a rapid destabilisation of highly mutually inclined orbits is commonly observed, due to the significant chaos that develops around the stability islands of the Lidov-Kozai resonance. The extent of the Lidov-Kozai resonant region is discussed for ten planetary systems (HD 11506, HD 12661, HD 134987, HD 142, HD 154857, HD 164922, HD 169830, HD 207832, HD 4732, and HD 74156).

Contact: `mara.volpi@unamur.be`

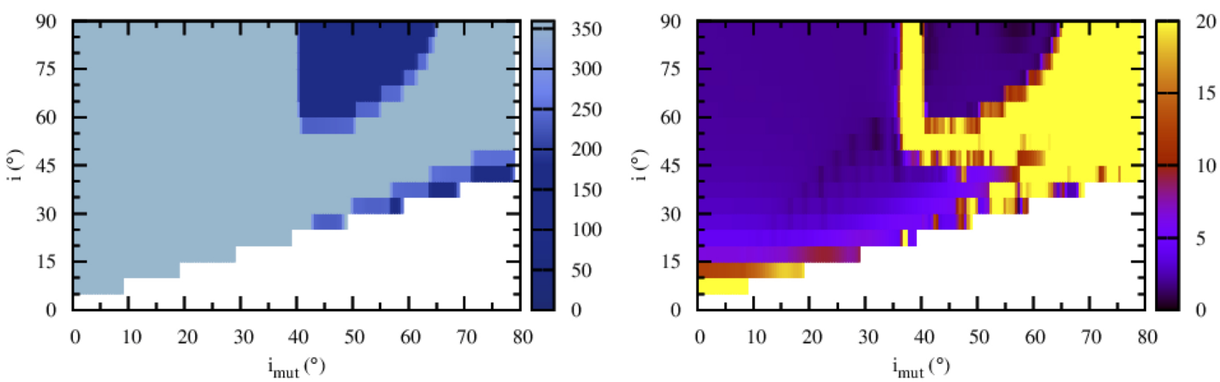

Figure 4: Phase-folded light curve of the newly validated planet resulting from an MCMC fit. K2 long-cadence data points are shown with errorbars from the 6.5-hour CDPP of the light curve. The model 1- and 2-sigma uncertainties are shaded in grey around the median model plotted in black. Residuals to the transit model are plotted below.

Validation of a Temperate Fourth Planet in the K2-133 Multiplanet System

R. Wells[1], *K. Poppenhaeger*[1,2,3], *C. A. Watson*[1]

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[2] Leibniz-Institute for Astrophysics Potsdam (AIP), An der Sternwarte 16, D-14482 Potsdam, Germany
[3] Institute for Physics and Astronomy, University of Potsdam, Karl-Liebknecht-Str. 24/25, D-14476 Potsdam, Germany

Monthly Notices of the Royal Astronomical Society, in press (arXiv:1905.05206)

We present follow-up observations of the K2-133 multi-planet system. Previously, we announced that K2-133 contained three super-Earths orbiting an M1.5V host star – with tentative evidence of a fourth outer-planet orbiting at the edge of the temperate zone. Here we report on the validation of the presence of the fourth planet, determining a radius of $1.73^{+0.14}_{-0.13}$ $R_{\oplus}$. Since the discovery, new data has been acquired allowing a more detailed characterisation of the system. In this work we present AO imaging, NIR spectra and Gaia DR2 data which further constrain the properties of the host star and therefore also the planets.

The four planets span the radius gap of the exoplanet population, meaning further follow-up would be worthwhile to obtain masses and test theories of the origin of the gap. In particular, the trend of increasing planetary radius with decreasing incident flux in the K2-133 system supports the claim that the gap is caused by photo-evaporation of exoplanet atmospheres. Finally, we note that K2-133 e orbits on the edge of the stars temperate zone, and that our radius measurement allows for the possibility that this is a rocky world. Additional mass measurements are required to confirm or refute this scenario.

Download/Website: `https://arxiv.org/abs/1905.05206`

Contact: `rwells02@qub.ac.uk`

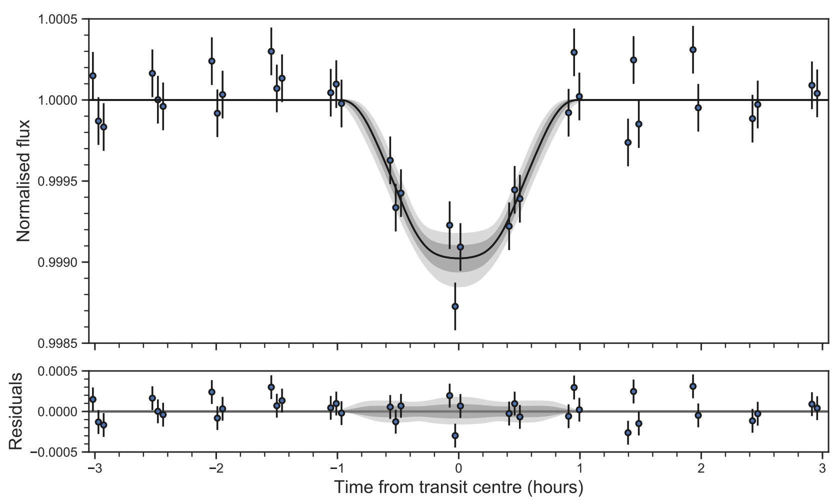

Figure 5: Phase-folded light curve of the newly validated planet resulting from an MCMC fit. K2 long-cadence data points are shown with errorbars from the 6.5-hour CDPP of the light curve. The model 1- and 2-sigma uncertainties are shaded in grey around the median model plotted in black. Residuals to the transit model are plotted below.

3 Jobs and Positions

Three PhD fellowships in exoplanet imaging and machine learning

Olivier Absil
STAR Institute & Montefiore Institute, University of Liège, Liège, Belgium

University of Liège, Oct. 2019

The STAR Institute and the Montefiore Institute of the University of Liège jointly invite applications for three PhD positions in the fields of machine learning and stellar coronagraphy, with applications in exoplanet imaging. These positions are open within the context of an ERC Consolidator Grant and of a ULiège-funded ARC grant, both starting in 2019. The proposed research subjects are the following:

1. Development of next-generation vortex coronagraphs
2. Application of deep learning techniques to exoplanet imaging
3. Development of focal-plane wavefront sensing techniques using machine learning

They are described in more detail here:
`https://sites.google.com/site/olivierabsil/research/epic-nnexi`

We seek excellent students with strong background in physical, engineering, and/or computer sciences. A successful candidate must hold a Masters degree or equivalent by the starting date of the position. Previous research experience and skills will be important criteria for the selection. Strong collaboration spirit and good communication skills in oral and written English are required. The PhD positions are not restricted by nationality. PhD students are funded for four years, earn competitive salaries, and are eligible for social security benefits.

Applicants should send a CV, transcripts of study records (with grades), and a brief statement of past research and research interests to Dr Olivier Absil (`olivier.absil@uliege.be`). They should also arrange for two reference letters to be sent to this address by the application deadline. Applicants may apply to one, two, or three of the proposed positions at a time. In case of an application to more than one position, applicants are kindly asked to rank the positions by order of preference. The applications are to be written in English.

Informal enquiries about these positions are welcome and should be sent to the address provided above. Starting dates are expected to be in September/October 2019, but are negotiable. Complete applications received by 15 July 2019 will receive full consideration. Candidates who submit complete applications before that date may be contacted earlier. Selections of candidates will continue until all positions are filled.

Download/Website: `https://jobregister.aas.org/ad/914aeee5`

Contact: `olivier.absil@uliege.be`

4 Conferences & Workshops

50$^{\text{th}}$ Saas-Fee Advanced Course: Astronomy in the Era of Big Data

Yann Alibert, Kevin Heng, Danuta Sosnowska, Nathan Hara, Xavier Dumusque, Lucio Mayer

Saas-Fee, Switzerland, March 15 - 20, 2020

The 2020 Saas-Fee Advanced Course of the Swiss Society for Astrophysics and Astronomy (SSAA) will be held from Sunday, 15 March to Friday, 20 March 2020 in Saas-Fee, in the Swiss Alps. This course has taken place annually since 1971 and will be devoted in 2020 to:

Astronomy in the Era of Big Data.

The three lecturers will be:
- Dr. Roberto Trotta (Imperial College London)
- Prof. Suzanne Aigrain (University of Oxford)
- Prof. Marc Huertas-Company (Paris Observatory)

Attendance will be limited by space, so please check out the meeting's webpage and pre-register now. We will alert you when the full registration page is available.

Download/Website: http://nccr-planets.ch/saasfee2020/

Rocky Worlds: From the Solar System to Exoplanets

Amy Bonsor, Oliver Shorttle, Helen Williams, Paul Rimmer, James Bryson, Mihkel Kama, Mark Wyatt, Steve Brereton, Philippa Downing
Kavli Institute,with the Institute of Astronomy & Department of Earth Sciences

University of Cambridge, January 6–8, 2020

This workshop aims to bring together planetary scientists, astronomers, and earth scientists to foster discussion and build the collaborations that will pave the way for the next decade of rocky exoplanet discovery and characterisation. The planets that are best understood are the four telluric planets of our own solar system. Applying the detailed understanding gleaned from these bodies is crucial in our interpretation of exoplanetary systems. With the on-going programs to search for planets around M dwarfs, such as TRAPPIST or MEARTH, as well as transit missions including TESS and upcoming missions such as PLATO, we can anticipate huge growth in the number of detected rocky exo-planets in the coming decades. As the characterisation of these new planetary systems proceeds it will in turn improve understanding of our own solar system, and in particular of how habitable Earth-like planets may form.
Schedule:
Monday January 6 – Formation: Are there universal pathways to forming rocky planets?
Tuesday January 7 – Atmospheres: Do rocky planets have atmospheres of nebular ices or volcanic gases?
Wednesday January 8 – Interiors: How can we constrain the interior structure and processes of rocky planets?

Download/Website:
https://www.kicc.cam.ac.uk/events/rocky-worlds-from-the-solar-system-to-exoplanets

Contact: rw2020@ast.cam.ac.uk

5 Exoplanet Archive Updates

May Updates at the NASA Exoplanet Archive

The NASA Exoplanet Archive team
Caltech/IPAC-NASA Exoplanet Science Institute, MC 100-22 Pasadena CA 91125

Pasadena CA USA, June 10, 2019

Note: All new planetary data can be viewed in the Confirmed Planets (`http://bit.ly/2MqFnub`), Composite Planet Data (`http://bit.ly/2l84Qw9`), and Extended Planet Data (`http://bit.ly/2NLy1Ci`) tables. New microlensing solutions are in the Microlensing Data table (`http://bit.ly/2JQr180`).

May 23, 2019

There are two new transiting planets, K2-295 b and K2-133 e, and seven new sets of planet parameters in the archive this week.

May 16, 2019

This week we have 18 new planets, bringing the total confirmed planet count for our **#Exoplanet4K** contest to **3,970**!

The new planets are: HD 210193 b, HD 211970 b, HD 39855 b, HIP 35173 b, HD 102843 b, HD 103949 b, HD 206255 b, HD 21411 b, HD 64114 b, HD 8326 b, HIP 54373 b & c, HD 24085 b, HIP 71135 b, NGTS-4 b, NGTS-5 b, and HD 15337 b & c.

May 9, 2019

This week there are two new TESS planets, TOI 216 b and c, both transiting with transit timing variations, and HD 221420 b, which was confirmed with the radial velocity method. There are also new parameter sets for HD 92987 b and HD 219077 b.

May 2, 2019

We've added three new transiting planets discovered by the Qatar Exoplanet Survey (QES), bringing our exoplanet count to **3,949**. For those who are following along with our **#Exoplanet4K** contest, that means only 51 planets until we reach 4,000! The new planets are Qatar-8 b, Qatar-9 b, and Qatar-10 b.

Make a Science-Ready TESS Image Mosaic: NExScI released a science-ready mosaic created with TESS data of the first five sectors of the South Ecliptic Pole. Create your TESS image mosaic with the source files available on the TESS ExoFOP (`http://bit.ly/2XCeCbi`) web page and the Montage Image Mosaic engine on the Montage website (`http://bit.ly/2KwmTKu`).

Download/Website: `https://exoplanetarchive.ipac.caltech.edu`

Contact: `mharbut@caltech.edu`

6 As seen on astro-ph

The following list contains all the entries relating to exoplanets that we spotted on astro-ph during May 2019.

May 2019

astro-ph/1905.00019: **The time evolution of dusty protoplanetary disc radii: observed and physical radii differ** by *Giovanni P. Rosotti et al.*

astro-ph/1905.00021: **On the millimetre continuum flux-radius correlation of proto-planetary discs** by *Giovanni P. Rosotti et al.*

astro-ph/1905.00155: **Spectroscopic Mass and Host-star Metallicity Measurements for Newly Discovered Microlensing Planet OGLE-2018-BLG-0740Lb** by *Cheongho Han et al.*

astro-ph/1905.00512: **The tidal parameters of TRAPPIST-1 b and c** by *R. Brasser, A. C. Barr, V. Dobos*

astro-ph/1905.00909: **A dust and gas cavity in the disc around CQ Tau revealed by ALMA** by *M. Giulia Ubeira Gabellini et al.*

astro-ph/1905.00935: **Outgassing As Trigger of 1I/'Oumuamua's Nongravitational Acceleration: Could This Hypothesis Work at All?** by *Zdenek Sekanina*

astro-ph/1905.01032: **Accounting for Multiplicity in Calculating Eta Earth** by *Jon K. Zink, Bradley M. S. Hansen*

astro-ph/1905.01239: **MOA-bin-29b : A Microlensing Gas Giant Planet Orbiting a Low-mass Host Star** by *I. Kondo et al.*

astro-ph/1905.01285: **Effects of Ringed Structures and Dust Size Growth on Millimeter Observations of Protoplanetary Disks** by *Ya-Ping Li et al.*

astro-ph/1905.01336: **Proxima Centauri b is not a transiting exoplanet** by *James S. Jenkins et al.*

astro-ph/1905.01860: **Separating extended disc features from the protoplanet in PDS 70 using VLT/SINFONI** by *V. Christiaens et al.*

astro-ph/1905.02096: **A spectral survey of an ultra-hot Jupiter: Detection of metals in the transmission spectrum of KELT-9 b** by *H.J. Hoeijmakers et al.*

astro-ph/1905.02282: **Binary Survival in the Outer Solar System** by *David Nesvorny, David Vokrouhlicky*

astro-ph/1905.02560: **Detectability of atmospheric features of Earth-like planets in the habitable zone around M dwarfs** by *F. Wunderlich et al.*

astro-ph/1905.02593: **NGTS-5b: a highly inflated planet offering insights into the sub-Jovian desert** by *Philipp Eigmüller et al.*

astro-ph/1905.02976: **Photochemical hazes in sub-Neptunian atmospheres with focus on GJ 1214 b** by *Panayotis Lavvas et al.*

astro-ph/1905.03029: **Rocky Planetesimal Formation Aided by Organics** by *Kazuaki Homma et al.*

astro-ph/1905.03153: **The Generalized Nonlinear Ohm's Law: How a Strong Electric Field Influences Nonideal MHD Effects in Dusty Protoplanetary Disks** by *Satoshi Okuzumi, Shoji Mori, Shu-ichiro Inutsuka*

astro-ph/1905.03171: **Retrieval of the fluid Love number k2 in exoplanetary transit curves** by *Hugo Hellard et al.*

astro-ph/1905.03252: **New Constraints From Dust Lines On The Surface Densities Of Protoplanetary Disks** by *Diana Powell et al.*

astro-ph/1905.03563: **Observability of Forming Planets and their Circumplanetary Disks II. – SEDs and Near-Infrared Fluxes** by *J. Szulágyi et al.*

astro-ph/1905.03603: **Optical polarized phase function of the HR 4796A dust ring** by *J. Milli et al.*

astro-ph/1905.03605: **On the stability of corotating and counter rotating P-type orbits around stellar binaries: a numerical study** by *Chaelin Hong, Maurice H.P.M. van Putten*

astro-ph/1905.03626: **Global climate by Rossby number in the Solar system planets** by *Sora Lee, Maurice H.P.M. van Putten*

astro-ph/1905.03722: **On the 3D secular dynamics of radial-velocity-detected planetary systems** by *Mara Volpi, Arnaud Roisin, Anne-Sophie Libert* astro-ph/1905.03766: **AutoRegressive Planet Search: Feasibility Study for Irregular Time Series** by *Andrew M. Stuhr et al.*

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