ExoPlanet News
An Electronic Newsletter

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Contents

1 Editorial

Welcome to Edition 126 of the ExoPlanet News! We are pleased to send you the last ExoPlanet newsletter of 2019 with abstracts of scientific papers, job ads, conference announcements, the updates from the NASA exoplanet archive, and an overview of the exoplanet-related articles on astro-ph. Thanks a lot to all of you who contributed to this rich issue of the newsletter!

As you may have heard, the launch of the CHEOPS satellite was planned for today 17. December 2019. However, due to a software error in the Soyuz rocket, the launch had to be postponed. A new launch date of tomorrow 18. December is targeted for Soyuz Flight VS23, with liftoff set 08:54:20 UTC. Obviously, we are very excited! To stay updated, check `https://twitter.com/Arianespace`. Keep your fingers crossed!

Looking ahead to Edition 127, we can announce that a new NCCR PlanetS editorial team will take over the edition of the newsletter. The new editorial team consists of Daniel Angerhausen (CSH Bern), Holly Capelo (Physics Institute Bern), Lokesh Mishra (Physics Institute Bern & Geneva Observatory), and Julia Venturini (ISSI Bern). For our dear readers and contributors, however, nothing will change - the new team is again looking forward to your paper abstract, job ad or meeting announcement. Also special announcements of all kinds are welcome. As always, we would also be happy to receive feedback concerning the newsletter. 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/).

The next issue will appear 14. January 2020. We wish to all of you a nice winter break!

Thanks for your support, and best regards from the outgoing editorial team,

Christoph Mordasini
Yann Alibert
Adrien Leleu
Sascha P. Quanz

2 Abstracts of refereed papers

Machine learning inference of the interior structure of low-mass exoplanets

P. Baumeister[1], *S. Padovan*[2], *N. Tosi*[1,2], *G. Montavon*[3], *N.Nettelmann*[2], *J. MacKenzie*[1], *M. Godolt*[1]

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The Astrophysical Journal, in press (arXiv:1911.12745)

We explore the application of machine learning based on mixture density neural networks (MDNs) to the interior characterization of low-mass exoplanets up to 25 Earth masses constrained by mass, radius, and fluid Love number k_2. We create a dataset of 900000 synthetic planets, consisting of an iron-rich core, a silicate mantle, a high-pressure ice shell, and a gaseous H/He envelope, to train a MDN using planetary mass and radius as inputs to the network. For this layered structure, we show that the MDN is able toinfer the distribution of possible thicknesses of each planetary layer from mass and radius of the planet. This approach obviates the time-consuming task of calculating such distributions with a dedicated set of forward models for each individual planet. While gas-rich planets may be characterized by compositional gradients rather than distinct layers, the method presented here can be easily extended to any interior structure model. The fluid Love number k_2 bears constraints on the mass distribution in the planets' interior and will be measured for an increasing number of exoplanets in the future. Adding k_2 as an input to the MDN significantly decreases the degeneracy of the possible interior structures. In an open repository we provide the trained MDN to be used through a Python Notebook.

Download/Website: `https://arxiv.org/abs/1911.12745`

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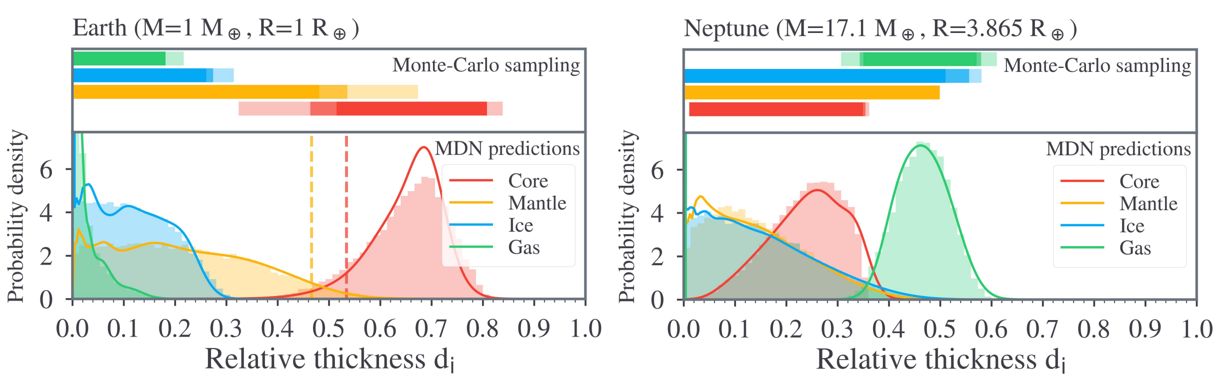

Figure 1: Baumeister et al.: MDN predictions of the relative interior layer thickness for Earth and Neptune using only mass and radius as inputs to the network. The colored lines show the combined Gaussian mixture prediction of the MDN. The area under each curve is normalized to one. The histograms show possible interior solutions within 5% of the input values obtained from an independent Monte Carlo sampling. The colored bars in the upper plots represent the range of solutions of valid interior structures obtained from the same Monte Carlo sampling. The shade of each bar corresponds to an uncertainty of 1%, 2%, and 5% in the observable parameters (from darkest to lightest, respectively). The vertical dashed lines in the Earth plot show the actual thickness of Earth's core and mantle from PREM (Dziewonski & Anderson 1981).

Evolution of the radius valley around low mass stars from Kepler and K2

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AAS journals, submitted (1912.02170)

We present calculations of the occurrence rate of small close-in planets around low mass dwarf stars using the known planet populations from the *Kepler* and *K2* missions. Applying completeness corrections clearly reveals the radius valley in the maximum a-posteriori occurrence rates as a function of orbital separation and planet radius. We measure the slope of the valley to be $r_{p,\text{valley}} \propto F^{-0.060\pm0.025}$ which bears the opposite sign from that measured around Sun-like stars thus suggesting that thermally driven atmospheric mass loss may not dominate the evolution of planets in the low stellar mass regime or that we are witnessing the emergence of a separate channel of planet formation. The latter notion is supported by the relative occurrence of rocky to non-rocky planets increasing from 0.5 ± 0.1 around mid-K dwarfs to 8.5 ± 4.6 around mid-M dwarfs. Furthermore, the center of the radius valley at 1.54 ± 0.16 $R_\oplus$ is shown to shift to smaller sizes with decreasing stellar mass in agreement with physical models of photoevaporation, core-powered mass loss, and gas-poor formation. Although current measurements are insufficient to robustly identify the dominant formation pathway of the radius valley, such inferences may be obtained by *TESS* with $\mathcal{O}(85,000)$ mid-to-late M dwarfs observed with 2-minute cadence. The measurements presented herein also precisely designate the subset of planetary orbital periods and radii that should be targeted in radial velocity surveys to resolve the rocky to non-rocky transition around low mass stars.

Download/Website: `https://arxiv.org/abs/1912.02170`

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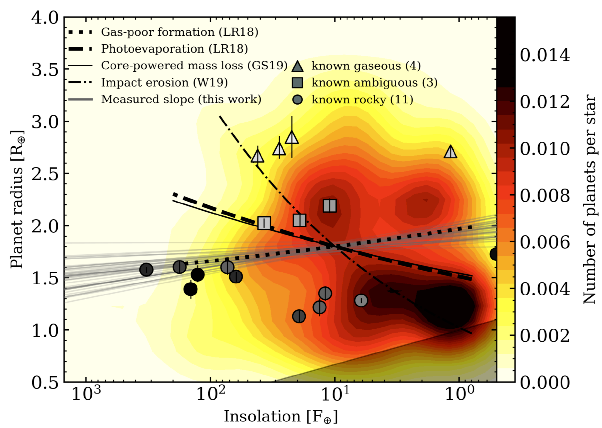

Figure 2: Cloutier & Menou: Planet occurrence rates versus insolation and planet radius around low mass and Sun-like stars. The maximum a-posteriori occurrence rate map calculated from the population of confirmed planets from *Kepler* and *K2* around low mass dwarf stars. Overplotted in black are model predictions of the transition from rocky to non-rocky planets in the following scenarios: core-powered mass loss, photoevaporation, and gas-poor formation. We measure the slope of the radius valley to be $r_{p,\text{valley}} \propto F^{-0.060\pm0.025}$ which is consistent with predictions from gas-poor formation of terrestrial planets. Also overplotted are planets with $\geq 3\sigma$ bulk density measurements from the literature that are classified as having either a rocky (*circles*), a gaseous (*triangles*), or an ambiguous (*squares*) bulk composition. Marker colors are indicative of the MAP planet bulk densities.

RSM detection map for direct exoplanet detection in ADI sequences

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Astronomy & Astrophysics, in press (arXiv:1912.05412)

Beyond the choice of wavefront control systems or coronographs, advanced data processing methods play a crucial role in disentangling potential planetary signals from bright quasi-static speckles. Among these methods, angular differential imaging (ADI) for data sets obtained in pupil tracking mode (ADI sequences) is one of the foremost research avenues, considering the many observing programs performed with ADI-based techniques and the associated discoveries. Inspired by the field of econometrics, here we propose a new detection algorithm for ADI sequences, deriving from the regime-switching model first proposed in the 1980s. The proposed model is very versatile as it allows the use of PSF-subtracted data sets (residual cubes) provided by various ADI-based techniques, separately or together, to provide a single detection map. The temporal structure of the residual cubes is used for the detection as the model is fed with a concatenated series of pixel-wise time sequences. The algorithm provides a detection probability map by considering two possible regimes for concentric annuli, the first one accounting for the residual noise and the second one for the planetary signal in addition to the residual noise. The algorithm performance is tested on data sets from two instruments, VLT/NACO and VLT/SPHERE. The results show an overall better performance in the receiver operating characteristic space when compared with standard signal-to-noise-ratio maps for several state-of-the-art ADI-based post-processing algorithms.

Download/Website: `http://arxiv.org/abs/1912.05412`

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Decoding the radial velocity variations of HD41248 with ESPRESSO

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Astronomy & Astrophysics, in press (arXiv:1911.11714)

Twenty-four years after the discoveries of the first exoplanets, the radial-velocity (RV) method is still one of the most productive techniques to detect and confirm exoplanets. But stellar magnetic activity can induce RV variations large enough to make it difficult to disentangle planet signals from the stellar noise. In this context, HD 41248 is an interesting planet-host candidate, with RV observations plagued by activity-induced signals. We report on ESPRESSO observations of HD 41248 and analyse them together with previous observations from HARPS with the goal of evaluating the presence of orbiting planets. Using different noise models within a general Bayesian framework designed for planet detection in RV data, we test the significance of the various signals present in the HD 41248 dataset. We use Gaussian processes as well as a first-order moving average component to try to correct for activity-induced signals. At the same time, we analyse photometry from the TESS mission, searching for transits

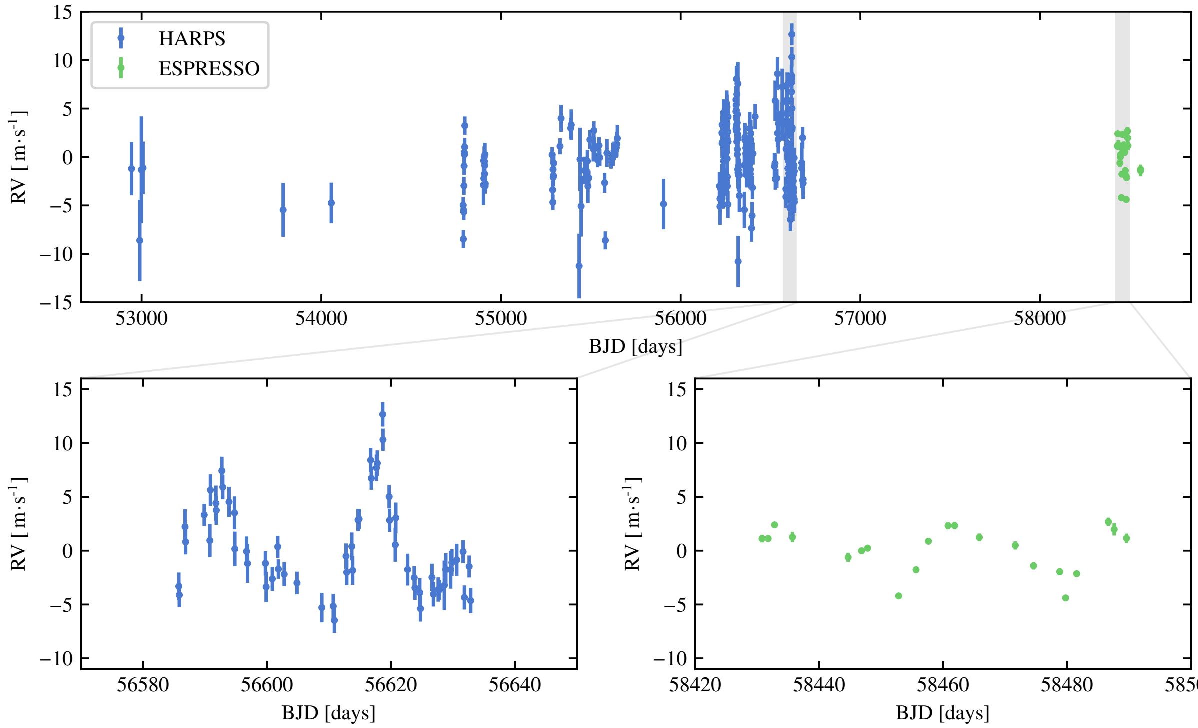

Figure 3: Faria et al.: Full set of RVs from HARPS (blue) and ESPRESSO (green). Average RV for each data set has been subtracted for visual comparison. The two bottom panels show a zoom on a subset of the HARPS observations (left) and the ESPRESSO observations (right). These two panels are shown on the same scale. Note that all ESPRESSO observations are shown with error bars but in most cases these are smaller than the points.

and rotational modulation in the light curve. The number of significantly detected Keplerian signals depends on the noise model employed, which can range from 0 with the Gaussian process model to 3 with a white noise model. We find that the Gaussian process alone can explain the RV data while allowing for the stellar rotation period and active region evolution timescale to be constrained. The rotation period estimated from the RVs agrees with the value determined from the TESS light curve. Based on the data that is currently available, we conclude that the RV variations of HD 41248 can be explained by stellar activity (using the Gaussian process model) in line with the evidence from activity indicators and the TESS photometry.

Download/Website: `https://arxiv.org/abs/1911.11714`

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HST/STIS capability for Love number measurement of WASP-121b

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The Astrophysical Journal, in press (1912.05889)

Data from transit light curves, radial velocity and transit timing observations can be used to probe the interiors of exoplanets beyond the mean density, by measuring the Love numbers h_2 and k_2. The first indirect estimate of k_2 for an exoplanet from radial velocity and transit timing variations observations has been performed by taking advantage of the years-spanning baseline. Not a single measurement of h_2 has been achieved from transit light curves, mostly because the photometric precision of current observing facilities is still too low. We show that the Imaging Spectrograph instrument on-board the Hubble Space Telescope could measure h_2 of the hot Jupiter WASP-121b if only few more observations were gathered. We show that a careful treatment of the noise and stellar limb darkening must be carried out to achieve a measurement of h_2. In particular, we find that the impact of the noise modelling on the estimation of h_2 is stronger than the impact of the limb darkening modelling. In addition, we emphasize that the wavelet method for correlated noise analysis can mask limb brightening. Finally, using presently available data, we briefly discuss the tentative measurement of $h_2 = 1.39^{+0.71}_{-0.81}$ in terms of interior structure. Additional observations would further constrain the interior of WASP-121b and possibly provide insights on the physics of inflation. The possibility of using the approach presented here with the Hubble Space Telescope provides a bridge before the high-quality data to be returned by the James Webb Space Telescope and PLATO telescope in the coming decade.

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

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A *Swift* view of X-ray and UV radiation in the planet-forming T-Tauri system PDS-70

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MNRAS, published (2019MNRAS.tmpL.163J)

PDS 70 is a $\sim$5 Myr old star with a gas and dust disc in which several proto-planets have been discovered. We present the first UV detection of the system along with X-ray observations taken with the *Neil Gehrels Swift Observatory* satellite. PDS 70 has an X-ray flux of 3.4×10^{-13} erg cm^{-2} s^{-1} in the 0.3-10.0 keV range, and UV flux (U band) of 3.5×10^{-13} erg cm^{-2} s^{-1} . At the distance of 113.4 pc determined from Gaia DR2 this gives luminosities of 5.2×10^{29} erg s^{-1} and 5.4×10^{29} erg s^{-1} respectively. The X-ray luminosity is consistent with coronal emission from a rapidly rotating star close to the log $\frac{L_{\rm X}}{L_{\rm bol}} \sim -3$ saturation limit. We find the UV luminosity is much lower than would be expected if the star were still accreting disc material and suggest that the observed UV emission is coronal in origin.

Download/Website: `https://doi.org/10.1093/mnrasl/slz169`

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An apparently eccentric orbit of the exoplanet WASP-12 b as a radial velocity signature of planetary-induced tides in the host star

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The Astrophysical Journal, in press (arXiv:1912.01360)

Massive exoplanets on extremely tight orbits, such as WASP-12 b, induce equilibrium tides in their host stars. Following the orbital motion of the planet, the tidal fluid flow in the star can be detected with the radial velocity method. Its signature manifests as the second harmonics of the orbital frequency that mimics a non-zero orbital eccentricity. Using the new radial velocity measurements acquired with the HARPS-N spectrograph at the Telescopio Nazionale Galileo and combining them with the literature data, we show that the apparent eccentricity of WASP-12 b's orbit is non-zero at a 5.8 sigma level, and the longitude of periastron of this apparently eccentric orbit is close to 270 degrees. This orbital configuration is compatible with a model composed of a circular orbit and a signature of tides raised in the host star. The radial velocity amplitude of those tides was found to be consistent with the equilibrium tide approximation. The tidal deformation is predicted to produce a flux modulation with an amplitude of 80 ppm which could be detected using space-born facilities.

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Radial velocity photon limits for the dwarf stars of spectral classes F–M

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The Astrophysical Journal Supplement Series, in press

The determination of extrasolar planet masses with the radial velocity (RV) technique requires spectroscopic Doppler information from the planet's host star, which varies with stellar brightness and temperature. We analyze Doppler information in spectra of F–M dwarfs utilizing empirical information from HARPS and CARMENES, and from model spectra. We come to the conclusions that an optical setup (BVR-bands) is more efficient that a near-infrared one ($YJHK$) in dwarf stars hotter than 3200 K. We publish a catalogue of 46,480 well-studied F–M dwarfs in the solar neighborhood and compare their distribution to more than one million stars from Gaia DR2. For all stars, we estimate the RV photon noise achievable in typical observations assuming no activity jitter and slow rotation. We find that with an ESPRESSO-like instrument at an 8m-telescope, a photon noise limit of $10\,\mathrm{cm\,s^{-1}}$ or lower can be reached in more than 280 stars in a 5 min observation. At 4m-telescopes, a photon noise limit of $1\,\mathrm{m\,s^{-1}}$ can be reached in a 10 min exposure in approx. 10,000 predominantly sun-like stars with a HARPS-like (optical) instrument. The same applies to $\sim$3000 stars for a red-optical setup covering the RIz-bands, and to $\sim$700 stars for a near-infrared instrument. For the latter two, many of the targets are nearby M dwarfs. Finally, we identify targets in which Earth-mass planets within the liquid water habitable zone can cause RV amplitudes comparable to the RV photon noise. Assuming the same exposure times, we find that an ESPRESSO-like instrument can reach this limit for $1\,M_\oplus$ planets in more than 1000 stars. The optical, red-optical, and near-infrared configurations reach the limit for $2\,M_\oplus$ planets in approximately 500, 700, and 200 stars, respectively.

Download/Website: `https://arxiv.org/abs/1912.04120`

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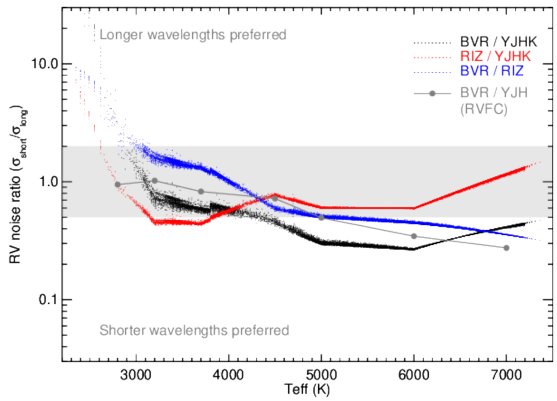

Figure 4: Reiners & Zechmeister: Ratios between RV photon noise achieved in observations of dwarf stars with different spectrograph designs as a function of stellar effective temperature. For each star, black points shows the ratio between the performance of a HARPS-like design covering the BVR-bands and a near-IR SPIROU-like design covering YJHK. The red and the blue points show RV noise ratios between a red-optical instrument covering RIZ (like CARMENES-VIS) and the near-IR design, and between the optical and red-optical designs, respectively. The grey circles show results from calculations using the radial velocity follow-up calculator from Cloutier et al., 2018. Within uncertainties, two spectrographs perform similarly if the ratio is located in the range 0.5–2.0 (grey).

Wind of change: Retrieving exoplanet atmospheric winds from high-resolution spectroscopy

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Astronomy & Astrophysics, in press (arXiv:1912.02787)

Context. The atmosphere of exoplanets has been studied extensively in recent years, making use of numerical models to retrieve chemical composition, dynamical circulation, or temperature from the data. One of the best observational probes in transmission is the sodium doublet thanks to its extensive cross-section. However, modelling the shape of planetary sodium lines has proven to be challenging. Models with different assumptions regarding the atmosphere have been employed to fit the lines in the literature, yet statistically-sound, direct comparisons of different models are needed to paint a clear picture. *Aims.* We aim to compare different wind and temperature patterns, as well as to provide a tool to distinguish them based on their best fit for the sodium transmission spectrum of the hot Jupiter HD 189733b. We parametrise different possible wind patterns that have already been tested the in literature and introduce the new option of an upwards-driven vertical wind. *Methods.* We construct a forward model where the wind speed, wind geometry, and temperature are injected into the calculation of the transmission spectrum. We embed this forward model in a nested sampling retrieval code to rank the models via their Bayesian evidence. *Results.* We retrieve a best-fit to the HD 189733b data for vertical upward winds $v_{\rm ver}(\rm mean) = 40 \pm 4$ km/s at altitudes above 10^{-6} bar. With the current data from HARPS, we cannot distinguish wind patterns for higher-pressure atmospheric layers. *Conclusions.* We show that vertical upwards winds in the upper atmosphere provide a possible explanation for the broad sodium signature in hot Jupiters. We highlight other influences on the width of the doublet and we explore strong magnetic fields acting on the lower atmosphere as one possible origin of the retrieved wind speed.

Download/Website: `https://arxiv.org/pdf/1912.02787.pdf`

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Tidal circularization of gaseous planets orbiting white dwarfs

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MNRAS, In Press, arXiv:1908.08052

A gas giant planet which survives the giant branch stages of evolution at a distance of many au and then is subsequently perturbed sufficiently close to a white dwarf will experience orbital shrinkage and circularization due to star-planet tides. The circularization timescale, when combined with a known white dwarf cooling age, can place coupled constraints on the scattering epoch as well as the active tidal mechanisms. Here, we explore this coupling across the entire plausible parameter phase space by computing orbit shrinkage and potential self-disruption due to chaotic f-mode excitation and heating in planets on orbits with eccentricities near unity, followed by weakly dissipative equilibrium tides. We find that chaotic f-mode evolution activates only for orbital pericentres which are within twice the white dwarf Roche radius, and easily restructures or destroys ice giants but not gas giants. This type of internal thermal destruction provides an additional potential source of white dwarf metal pollution. Subsequent tidal evolution for the surviving planets is dominated by non-chaotic equilibrium and dynamical tides which may be well-constrained by observations of giant planets around white dwarfs at early cooling ages.

Download/Website: `https://arxiv.org/abs/1908.08052`

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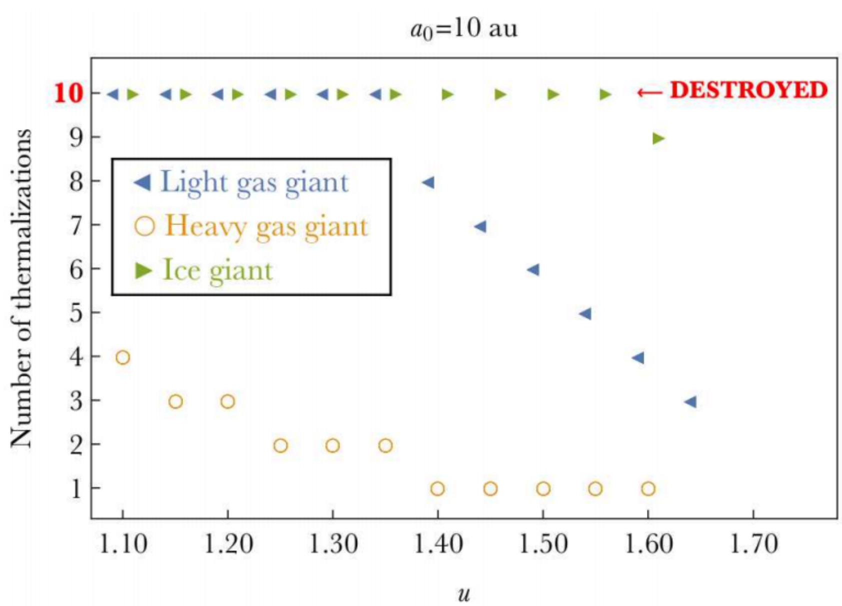

Figure 5: Veras & Fuller 1: Number of thermalization events for three different types of planets on highly eccentric orbits around white dwarfs, when built up energy from chaotic tidal interactions is released within the planet. The x-axis refers to the initial orbital pericentre in units of the host star disruption (or Roche) radius. A total of 10 thermalization events may disrupt the planet, which we denote here as "destroyed". Ice giants may be frequently destroyed when chaotic tidal evolution is active.

The dynamical history of the evaporating or disrupted ice giant planet around white dwarf WD J0914+1914

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MNRAS, Submitted, arXiv:1912.02199

Robust evidence of an ice giant planet shedding its atmosphere around the white dwarf WD J0914+1914 represents a milestone in exoplanetary science, allowing us to finally supplement our knowledge of white dwarf metal pollution, debris discs and minor planets with the presence of a major planet. Here, we discuss the possible dynamical origins of this planet, WD J0914+1914b. The very young cooling age of the host white dwarf (13 Myr) combined with the currently estimated planet-star separation of about 0.07 au imposes particularly intriguing and restrictive coupled constraints on its current orbit and its tidal dissipation characteristics. The planet must have been scattered from a distance of at least a few au to its current location, requiring the current or former presence of at least one more major planet in the system. We show that WD J0914+1914b could not have subsequently shrunk its orbit through chaotic f-mode tidal excitation (characteristic of such highly eccentric orbits) unless the planet was or is highly inflated and had at least partially thermally self-disrupted from mode-based energy release. We also demonstrate that if the planet is currently assumed to reside on a near-circular orbit at 0.07 au, then non-chaotic equilibrium tides impose unrealistic values for the planet's tidal quality factor. We conclude that WD J0914+1914b either resembles a disrupted "Super-Puff" whose remains reside on a circular orbit, or a larger or denser ice giant on a currently eccentric orbit. Distinguishing these two possibilities strongly motivates follow-up observations.

Download/Website: `https://arxiv.org/abs/1912.02199`

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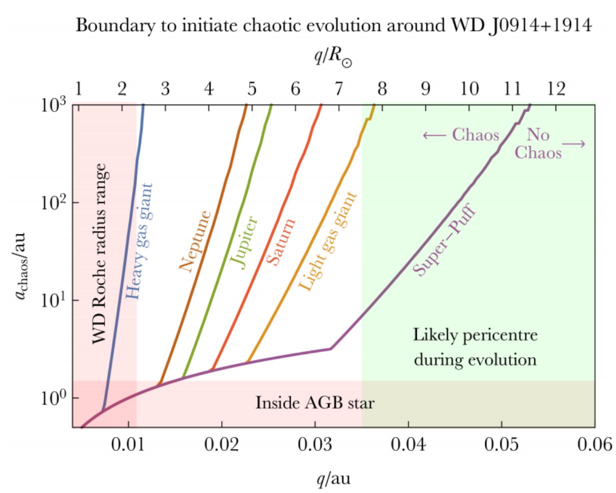

Figure 6: Veras & Fuller 2: Demonstration that WD J0914+1914b was very unlikely to have experienced chaotic tidal evolution unless the planet is or was a highly-inflated Super-Puff. The curves represent the minimum initial semimajor axes (y-axis) for which different types of planets would have experienced chaotic tidal evolution around the white dwarf for given orbital pericentres (x-axes). Because Super-Puffs are particularly vunerable to self-disruption through chaotic tides, current observations may be of a partially or fully disrupted ice giant.

3 Jobs and Positions

Postdoctoral Research Fellow in Astrophysical Fluid Dynamics

Dr Adrian J. Barker
University of Leeds, UK

University of Leeds, Leeds, UK, April–October 2020

Applications are invited for a Postdoctoral Research Fellow to join a Science and Technology Facilities Council (STFC) funded project to investigate tidal flows in planets and stars. The project will involve performing hydrodynamical and magnetohydrodynamical simulations to study tidal flows in spherical, ellipsoidal or Cartesian geometries, using and extending one or more existing codes. The results from these calculations will be applied to interpret current observations of extrasolar planets and close binary stars, and to make predictions.

The successful candidate will work with Dr Adrian Barker in the Department of Applied Mathematics (https://eps.leeds.ac.uk/maths/staff/4006/dr-adrian-j-barker), and will join the Astrophysical and Geophysical Fluid Dynamics research group (https://agfd.leeds.ac.uk), which is one of the largest such groups in the world. This project will strongly complement and benefit from other STFC-funded projects at Leeds, such as those in planetary and stellar dynamos, and magnetic and thermal evolution of magnetars. The research will also complement and benefit from The Leeds Institute for Fluid Dynamics (https://fluids.leeds.ac.uk), a cross-disciplinary research institute in fluid dynamics at Leeds, which hosts an EPSRC Centre for Doctoral Training in Fluid Dynamics.

The post is available from 1st April 2020, but the start date is flexible and could be delayed up until 1st October 2020 at the latest. The funds are available for 2 years and the salary range is Grade 7 (£33,797–£40,322 p.a.).

Applicants should have a PhD (or have submitted your thesis before taking up the role) in a relevant discipline (e.g. Astrophysics, Applied Mathematics or Planetary Sciences), together with computational experience, and they should be able to demonstrate the ability to conduct independent research and possess a developing track record of publications in international journals. In addition, the applicant must have excellent communication, planning and team working skills.

Applications must be made online (using the link below) before 23.59 (UK time) on the advertised closing date. Applicants must submit a CV and Publication List and provide the names and contact details of 3 people from whom references letters may be requested. Informal enquiries are welcome and should be directed to Adrian Barker (A.J.Barker@leeds.ac.uk).

Closing Date: 17th January 2020

Download/Website: https://jobs.leeds.ac.uk/Vacancy.aspx?ref=EPSMA1005

Contact: A.J.Barker@leeds.ac.uk

Postdoctoral Position in XUV studies of exoplanet systems and their host stars

L. Corrales, Department of Astronomy, University of Michigan

Applications are invited for a postdoctoral research position in the Department of Astronomy at the University of Michigan, to start Fall 2020. The position will be appointed for one year, with the possibility of renewal for up to two additional years, contingent on positive yearly progress evaluations and the availability of funding.

The postdoc will work to develop a new program at the University of Michigan in high-energy characterization of exoplanet host stars and their effects on their planetary systems. This program will involve both observational and theoretical work. Any expertise related to the goals of the program will be considered. Candidates will be evaluated on (1) experience with observational techniques, (2) science related to high energy effects of stellar radiation on planet formation and evolution, and (3) commitment to fostering an inclusive research environment.

In this position, the postdoc will have significant freedom to develop and start new projects with the resources available at University of Michigan. This includes institutional access to the twin Magellan 6.5-m telescopes in Chile, the MDM 1.3-m and 2.4-m telescopes on Kitt Peak, the Swift X-ray observatory, the NOEMA millimeter array, and the university's newly upgraded high-performance computing facilities ($\sim$13,000 cores). For more information, see https://lsa.umich.edu/astro/facilities

The University of Michigan hosts a vibrant astrophysics research community within the Astronomy and Physics Departments, as well as significant expertise in planetary sciences within the Earth & Environmental Sciences and Climate & Space Sciences Departments. The Michigan Institute for Research in Astrophysics funds cross-disciplinary efforts, including a series of intellectually stimulating conferences. The University of Michigan is an equal opportunity affirmative action employer. We encourage applications from people holding any identity(ies) that have been traditionally underrepresented in the field of astronomy. The Department of Astronomy values diversity, equity, and inclusion, and is dedicated to self-education and self-improvement in these areas. Please see the Astro-DEI website for more details on actions and events: https://sites.google.com/umich.edu/astro-dei

All materials should be received by January 15 for full consideration. Applicants must have a PhD, or expect to receive one before their start date. To apply please go to https://careers.umich.edu/job_detail/181606/postdoctoral_researcher_in_exoplanets_and_their_host_stars and submit the following application materials:

- A cover letter that summarizes the candidate's experience in the evaluation criteria (1, 2, and 3, above), no more than 1.5 pages
- CV, including a list of publications,
- A brief description of research interests and experience (no more than 3 pages).
- Three letters of reference, to be emailed directly to liac@umich.edu with the job candidate's name in the subject line.

Late applications can be accepted with advance notice of intent to apply.

Download/Website: `https://jobregister.aas.org/ad/ea93fc87`

Contact: `liac@umich.edu`

PhD Position in Solar, Stellar and Exoplanet Science

Raphaëlle D. Haywood

Department of Physics & Astronomy, University of Exeter, UK, September 2020

We invite creative and talented individuals to apply for a fully funded PhD position to work on characterising small exoplanets and their host stars.

The successful applicant will join Exeter's vibrant Astrophysics group, one of the UK's leading and largest groups for studying exoplanets and stars. They will work primarily with Dr Raphaëlle Haywood on observations of the Sun and of other stars to characterise the small planets orbiting them.
Read more on the project: http://emps.exeter.ac.uk/physics-astronomy/research/astrophysics/phd-opportunities/currentopportunities/robust_masses_small_exoplanets/

The successful applicant will have a strong interest in solar and stellar physics, and observational exoplanet science. Applicants must have obtained, or be about to obtain, a Masters degree, or an equivalent qualification, in an appropriate area of science or technology.

We particularly welcome applications from groups currently underrepresented in the workforce.
Read more on our commitment and support of equity and inclusion: https://emps.exeter.ac.uk/physics-astronomy/inclusivity/

Salary: Annual tax-free stipend of at least 15,009 GBP
Duration: 3.5 years
Start date: September 2020 or as soon as possible thereafter.

Applicants will be asked to provide:
- a CV;
- a cover letter outlining your academic interests, any prior research experience and reasons for wishing to undertake the project;
- two references from referees familiar with your academic work;
- if you are not a national of a majority English-speaking country, you will need to submit evidence of your proficiency in English.

To apply: http://emps.exeter.ac.uk/studentships/

If you have any questions, please email Raphaëlle Haywood.

Contact: rhaywood@cfa.harvard.edu

Postdoctoral Researchers in Exoplanet Atmospheres and High Resolution Spectroscopy

Prof. Emily Rauscher
[1] Another Town, Another Planet, A Galaxy Far Far Away
[2] Sample Institute, Village Road 1, Smalltown, USA
[3] Example Observatory, Over the Hill 4, Somewhere, UK

Ann Arbor, Michigan, U.S.A., Summer/Early Fall, 2020

Applications are invited for two postdoctoral research positions in the Department of Astronomy at the University of Michigan, to start in Fall 2020 or sooner. Both positions will initially be for one year, but are expected to be extended for up to three years, contingent on funding and positive yearly progress evaluations.
One postdoctoral position is to work on a new program at the University of Michigan (with Profs Rauscher, Meyer, and Monnier) to do multi-dimensional atmospheric characterization of hot Jupiters using high resolution spectroscopy. This program will involve both observational and theoretical work. For this postdoctoral position any expertise related to the goals of the program will be considered, but it is preferred that candidates have previous experience in obtaining and analyzing high resolution data, or similar.
The other postdoctoral position is to work with professor Emily Rauscher on theoretical studies of exoplanet atmospheres, with a particular focus on identifying observational signatures of multi-dimensional properties. Applicants should have previous experience researching (exo)planet atmospheres, but a wide variety of interests and backgrounds are welcome. A strong candidate for this position will be someone whose interests overlap with Prof. Rauscher and who has ideas for new projects they would like to start. Of current interest is: 1) science related to the program mentioned above, or 2) science regarding creating two- or three-dimensional maps from phase curve and secondary eclipse observations, but new science directions will also be given consideration.
The University of Michigan hosts a vibrant astrophysics research community within the Astronomy and Physics Departments, as well as significant expertise in planetary sciences within the Earth & Environmental Sciences and Climate & Space Sciences Departments. The Michigan Institute for Research in Astrophysics funds cross-disciplinary efforts, including a series of intellectually stimulating conferences. Our research resources include institutional access to the twin Magellan 6.5-m telescopes in Chile, the MDM 1.3-m and 2.4-m telescopes on Kitt Peak, the Swift X-ray observatory, the NOEMA millimeter array, and the university's newly upgraded high-performance computing facilities ($\sim$ 13,000 cores).
Candidates are welcome to apply for one or both positions through a single application. All materials should be received by December 20 for full consideration (or as soon as possible thereafter). Applicants must have a PhD, or expect to receive one before their start date. To apply please email a single PDF to erausche@umich.edu (including something like "postdoc application" in the subject line), containing: a) a cover letter; b) a CV including a list of publications; d) a brief description of research interests and experience (no more than 3 pages). Three letters of reference must also be sent to the same address.
The University of Michigan is an equal opportunity affirmative action employer; women and minorities are encouraged to apply. In addition to that official language, we also encourage applications from people holding any identity(ies) marginalized in astronomy. We are a department that values diversity, equity, and inclusion: $https://sites.google.com/umich.edu/astro-dei/home$

Download/Website: `https://sites.google.com/umich.edu/emily-rauscher/home`

Contact: `mrmeyer@umich.edu`

18 Post-doctoral Fellowships on the Origin and Evolution of Life

Floris van der Tak[1,2] *& Wouter Roos*[3]
[1] Kapteyn Astronomical Institute, University of Groningen, The Netherlands
[2] SRON Netherlands Institute for Space Research
[3] Zernike Institute for Advanced Materials, University of Groningen, The Netherlands

Groningen / Leiden / Eindhoven, April–May 2020

The origin and nature of life and its distribution in the universe are fundamental questions for humanity. How did biomolecules form? How did life emerge? How did cellular functions evolve? Is there life elsewhere? Will life cope with human-induced challenges?

You:

- are an ambitious scientist fascinated by very fundamental questions about life, and you are ready for the next research career step.
- have research experience in (bio)chemistry, (bio)physics, molecular biology, computational science, systems biology, evolutionary biology, ecology, astrophysics or geoscience.
- can develop an original and innovative idea for an interdisciplinary research project on the origins and evolution of life.
- are curious to learn new scientific languages to make the necessary crossovers between your field and other fields.

Then apply for a position in our exciting interdisciplinary oLife Fellowship Programme.

The oLife Fellowship Programme is a joint initiative by seven world-leading research institutes of three universities in The Netherlands (University of Groningen, Leiden University, Eindhoven University of Technology). Supported by funding from the Horizon 2020 Framework Programme of the European Union, we offer 18 post-doctoral fellowships for interdisciplinary research on fundamental questions concerning the origin, evolution and distribution of life in the universe.

Using a collaborative, interdisciplinary approach, we aim to break new grounds in four scientific areas:

1. Planetary preconditions and boundary conditions of Life, and its origins here on Earth
2. Defining properties and synthesis of Life, from the molecular to the biosphere level
3. Modelling, predicting and steering of Life
4. Distribution of Life across the universe

Job Description
As a fellow in the oLife Fellowship Programme you are given the opportunity to work on your own interdisciplinary research project with advisors and research institutes of your own choice.
Together with 17 other fellows, you will follow a joint research and training programme, consisting of scientific lectures, academic and professional skills training, and career guidance.
In the Netherlands, teaching and supervising students is an integral part of a researcher's position. Therefore, you will be expected to prepare and teach your own lecture series on your field(s) of expertise and to supervise student research projects. Also, you are offered the opportunity to go on secondments with our leading industrial, academic or non-profit partner organizations.
For more detailed information about the research, the involved research institutes, prospective supervisors and the training programme, please visit our website.

Download/Website: `www.olife-programme.eu`

Contact: `olife@rug.nl`

4 Conferences

OHP 2020 - Colloquium : Planets of red dwarf stars

SOC chairs: Rodrigo Diaz and Xavier Delfosse

Observatoire de Haute-Provence (France), 27 Sept. - 2 Oct. 2020

Planets orbiting low-mass M-dwarf stars have been among the prime targets of exoplanet research for many years. The well-known reasons include an increased transit depth, radial velocity signal, and contrast with respect to planets orbiting hotter stars. With the upcoming telescopes and observatories such as JWST and the E-ELT, the characterisation of the atmospheres of rocky planets around low-mass stars is going to become feasible, and will open new avenues of research.

The Colloquium ”OHP-2020: planets of red dwarf stars” will review the last years of observational and theoretical advances in the research of planets around low-mass stars, including their detection and the characterisation of their interior structure and atmospheres. We hope to identify ways to advance the key questions and solve the most pressing issues regarding the study of these systems, exploring the synergies between current and new facilities, and theoretical advances.

The colloquium will focus on:
- detection of exoplanets around low-mass stars by radial-velocity, transit, and imaging surveys
- characterisation of M-dwarf planets (e.g. atmospheres, interiors, obliquity, host multiplicity, etc.)
- interior and atmospheric modelling (including habitability around red dwarfs)
- stellar variability for the lowest-mass stars (granulation, rotation, activity cycles, etc.)
- theories of formation and evolution
- future instrumentation and observatories

The Observatoire de Haute Provence is located in Southern France, near the village of Saint Michel l'Observatoire. It is place of discovery of 51 Peg b –an achievement that earned Mayor & Queloz the Nobel prize in Physics in 2019– and of the co-discovery of Gl876 b, the first planet detected around an M-dwarf star. The 193-cm telescope is now equipped with the SOPHIE spectrograph, which produces a steady contribution to exoplanet studies. Up to 80 participants are expected. Accommodation will be provided inside and close to the Observatory for the duration of the Colloquium. Students and post-docs are particularly encouraged to register and contribute their work. Limited financial support to cover travel and lodging expenses will be available for students/young researchers that submit abstract.

Science Organizing Committee

Yann Alibert *U. Berne, Switzerland*
Isabelle Boisse *LAM-Marseille, France*
Brendan Bowler *U. Texas at Austin, USA*
Xavier Delfosse *IPAG-Grenoble, France* **co-chair**
Rodrigo Diaz *IAFE, U. Buenos Aires / ICAS, U. of San Martin, Argentina* **chair**
Caroline Dorn *U. Zurich, Switzerland*
Courtney Dressing *Univ. of California at Berkeley, USA*
Teruyuki Hirano *Tokyo Inst of Technology, Japan*
Jeremy Leconte *LAB-Bordeaux, France*
Christophe Lovis *U. Geneva, Switzerland*
Ignasi Ribas *IEEC-CSIC, Spain*
Barbara Rojas Ayala *IAI-UTA, Chile*
Elisabeth Newton *Dartmouth College, USA*
Ignas Snellen *U. Leiden, Netherlands*

Isabelle Boisse and Alexandre Santerne (LAM): Chair and co-chair of the LOC

Download/Website: `https://ohp2020.sciencesconf.org/`

Contact: `ohp-colloque2020@lam.fr`

The Sharpest Eyes on the Sky: A 2020 vision for high angular resolution astronomy

Chair: S. Kraus

University of Exeter, UK, April 20-24th 2020

Join us to discuss the latest scientific results obtained with optical interferometry and other high angular resolution imaging techniques (ALMA, SPHERE, GPI, ...). There will be presentations on operational aspects, ongoing and future instrumentation development activities at CHARA and VLTI, and opportunities to discuss synergies between facilities.

We are charging a registration fee of GBP (£) 95 per delegate (with financial support from ERC project "Image-PlanetFormDiscs" and the University of Exeter, UK). This fee covers all conference events including a ticket for the conference dinner and attendance at one of two excursions we are offering for the Wednesday afternoon. More information is provided on the "Registration" and "Programme" pages of our website.

We are seeking talk and poster contributions. If you would like to present your work, please follow the links on our website to submit an abstract.

Please note the deadline for registration and talk/poster abstract submission is March 6th 2020.

Download/Website: `http://sites.exeter.ac.uk/sharpesteyes2020/`

Contact: `sharpesteyes2020@exeter.ac.uk`

NASA Exoplanet Program Analysis Group Meeting 21

Michael R. Meyer
Department of Astronomy, The University of Michigan

Honolulu, HI, U.S.A., January 3-4, 2020

The NASA Exoplanet Program Analysis Group (ExoPAG) will have its next face to face meeting January 3-4, 2020 just before the 235th AAS meeting in Honolulu, HI. If you are interested in NASA's Exoplanet Program, you are a member of ExoPAG! The program for the meeting includes a number of programmatic updates as well as invited presentations on topics of interest to the community, as well as an embedded "mini-symposium" on exoplanet demographics. More information, including registration button, can be found at the URL below.

Download/Website: `https://exoplanets.nasa.gov/exep/events/292/exopag-21/`

Contact: `mrmeyer@umich.edu`

2020 Sagan Summer Workshop: Finding and Characterizing Exoplanets with Extreme Precision Radial Velocities

D. Gelino, E. Furlan
NASA Exoplanet Science Institute, California Institute of Technology, Pasadena, CA, USA

Pasadena, CA, July 20-24, 2020

Join us in 2020 for the 20th Sagan Summer Workshop! This year's topic is extreme precision radial velocity for finding and characterizing exoplanets. Attendees will participate in hands-on group projects and will have the opportunity to present their own work through short presentations (research POPs) and posters. More details will be posted on the workshop website in early 2020.

The Sagan Summer Workshops are free to attend and are aimed at graduate and post doctoral level students, however anyone who is interested in learning more about the field is welcome to attend. Videos of presentations from past summer workshops are available on the Sagan Exoplanet Summer Workshop YouTube channel.

Agenda topics include:

- Why RVs are Important
- Fundamentals of PRV
- Different Types of EPRV Instruments
- Lessons Learned from Operating an EPRV Instrument
- Past and Future of EPRV Science
- Overview of RV Planet Signal Fitting
- Mitigating Telluric Contamination
- Strategies for Mitigating Stellar Variability
- Physics Responsible for Sources of Stellar Variability
- Spectroscopy of Planet Atmospheres
- High-Resolution Spectroscopy of Exoplanet Atmospheres
- The EPRV Initiative

Download/Website: `http://nexsci.caltech.edu/workshop/2020`

UK Exoplanet Community Meeting

Amaury Triaud

Elgar Concert Hall, Bramall Building, University of Birmingham, 06, 07 & 08 April 2020

The University of Birmingham welcomes the 2020 edition of the UK Exoplanet community meeting. The Scientific Organising Committee is composed of Beth Biller, Amy Bonsor, Bill Chaplin, Raphaëlle Haywood, Nathan Mayne, Farzana Meru and Amaury Triaud.

UKEXOM showcases the particularly dynamic research related to exoplanets that takes place in the United Kingdom. The conference especially encourages submissions by PhD students and postdoctoral researchers. Researchers from any nation are welcomed to attend.

Registration is currently not open, but we expect it to open in early January. To limit carbon emission, please consider train travel to reach Birmingham.

Download/Website: `www.ukexom2020.uk`

Contact: `ukexom2020@contacts.bham.ac.uk`

5 Exoplanet Archive Updates

November 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, December 15, 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`).

November 21, 2019
Please Take Our User Survey! We'd like to learn more about our users and how they use our data, tools, and other services. Please go to the following link and answer a few simple questions: `https://www.surveymonkey.com/r/nasaexoplanetarchive`
The survey should not take more than 5–7 minutes of your time. Thank you!

Six Planets This Week
This week we have six new planets, including three transiting, two radial velocity planets, and one pulsar timing planet. They are: NGTS-8 b, NGTS-9 b, Qatar-6 b, HD 220197 b, HD 233832 b, and PSR B0329+54 b.

November 7, 2019
This week we have nine new planets found using four different discovery methods, including five new TESS planets, as well as 18 microlensing solutions and one new planet parameter set.
The new planets are: LP 791-18 b & c (transit), TOI 163 b (transit), TOI 125 b & c (transit), Kepler-448 c (transit timing variations), KMT-2018-BLG-1990L b (microlensing), MOA-bin-29 b (microlensing), and HD 125390 b (radial velocity).

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

Contact: `mharbut@caltech.edu`

6 As seen on astro-ph

November 2019

astro-ph/1911.00084: **Hot Jupiter Atmospheric Flows at High Resolution** by *Kristen Menou*

astro-ph/1911.00278: **Importance of Giant Impact Ejecta for Orbits of Planets Formed during the Giant Impact Era** by *Hiroshi Kobayashi, Kazuhide Isoya, Yutaro Sato*

astro-ph/1911.00380: **Ionized calcium in the atmospheres of two ultra-hot exoplanets WASP-33b and KELT-9b** by *F. Yan et al.*

astro-ph/1911.00518: **Spiral arms in the proto-planetary disc HD100453 detected with ALMA: evidence for binary-disc interaction and a vertical temperature gradient** by *G. P. Rosotti et al.*

astro-ph/1911.00520: **Multi-planet disc interactions in binary systems** by *Alessia Franchini, Rebecca G. Martin, Stephen H. Lubow*

astro-ph/1911.00629: **Collapse of the general circulation in shortwave-absorbing atmospheres: an idealized model study** by *Wanying Kang, Robin Wordsworth*

astro-ph/1911.01191: **The Effect of Clouds as an Additional Opacity Source on the Inferred Metallicity of Giant Exoplanets** by *Anna Julia Poser, Nadine Nettelmann, Ronald Redmer*

astro-ph/1911.01428: **Planet-disk interaction in disks with cooling: basic theory** by *Ryan Miranda et al.*

astro-ph/1911.01495: **Asteroid Photometry from the Transiting Exoplanet Survey Satellite: A Pilot Study** by *A. McNeill et al.*

astro-ph/1911.01530: **The effects of disk self-gravity and radiative cooling on the formation of gaps and spirals by young planets** by *Shangjia Zhang, Zhaohuan Zhu*

astro-ph/1911.01643: **Identifiable Acetylene Features Predicted for Young Earth-like Exoplanets with Reducing Atmospheres undergoing Heavy Bombardment** by *P. B. Rimmer et al.*

astro-ph/1911.01692: **Wind erosion on Mars and other small terrestrial planets** by *Maximilian Kruss et al.*

astro-ph/1911.02012: **TOI-132 b: A short-period planet in the Neptune desert transiting a V=11.3 G-type star** by *Matías R. Díaz et al.*

astro-ph/1911.02022: **The Feasibility of Directly Imaging Nearby Cold Jovian Planets with MIRI/JWST** by *Jonathan Brande et al.*

astro-ph/1911.02039: **Secular Eccentricity Oscillations in Axisymmetric Disks of Eccentric Orbits** by *Jacob Fleisig, Alexander Zderic, Ann-Marie Madigan*

astro-ph/1911.02051: **Transmission Spectroscopy of WASP-79b from 0.6 to 5.0 μm** by *Kristin S. Sotzen et al.*

astro-ph/1911.02292: **The origin of the high metallicity of close-in giant exoplanets: Combined effect of the resonant and aerodynamic shepherding** by *Sho Shibata, Ravit Helled, Masahiro Ikoma*

astro-ph/1911.02439: **OGLE-2015-BLG-1771Lb: A Microlens Planet Orbiting an Ultracool Dwarf?** by *Xiangyu Zhang et al.*

astro-ph/1911.02473: **The Dynamics of Interstellar Asteroids and Comets within the Galaxy: an Assessment of Local Candidate Source Regions for 1I/'Oumuamua and 2I/Borisov** by *Tim Hallatt, Paul Wiegert*

astro-ph/1911.02814: **NGTS-8b and NGTS-9b: two non-inflated hot-Jupiters** by *Jean C. Costes et al.*

astro-ph/1911.02880: **On one effect of coronal mass ejections influence on the envelopes of hot Jupiters** by *A.G. Zhilkin, D.V. Bisikalo, P.V. Kaigorodov*

astro-ph/1911.02979: **Estimating trajectories of meteors: an observational Monte Carlo approach – I. Theory** by *Denis Vida et al.*

astro-ph/1911.02983: **Habitable Zone Boundaries for Circumbinary Planets** by *Wolf Cukier et al.*

astro-ph/1911.03182: **The Acceleration of Superrotation in Simulated Hot Jupiter Atmospheres** by *Florian Debras et al.*

astro-ph/1911.03358: **ACCESS: A Visual to Near-infrared Spectrum of the Hot Jupiter WASP-43b with Evidence of H2O, but no evidence of Na or K** by *Ian C. Weaver et al.*

astro-ph/1911.03579: **Host Star Dependence of Small Planet Mass-Radius Distributions** by *Andrew R Neil, Leslie A Rogers* astro-ph/1911.03582: **A Joint Mass-Radius-Period Distribution of Exoplanets** by *Andrew R. Neil, Leslie A. Rogers*

astro-ph/1911.03777: **Dust in brown dwarfs and extra-solar planets. VII. Cloud formation in diffusive atmospheres** by *Peter Woitke, Christiane Helling, Ophelia Gunn*

astro-ph/1911.03984: **The Lidov-Kozai Oscillation and Hugo von Zeipel** by *Takashi Ito, Katsuhito Ohtsuka*

astro-ph/1911.03997: **Multilayer Perceptron and Geometric Albedo Spectra for Quick Parameter Estimations of Exoplanets** by *Timothy K Johnsen, Mark S Marley*

astro-ph/1911.04106: **Exoplanet Imitators: A test of stellar activity behavior in radial velocity signals** by *Chantanelle Nava et al.*

astro-ph/1911.04366: **MuSCAT2 multicolour validation of TESS candidates: an ultra-short-period substellar object around an M dwarf** by *H. Parviainen et al.*

astro-ph/1911.04441: **Characterizing Exoplanet Habitability** by *Ravi kumar Kopparapu, Eric T. Wolf, Victoria S. Meadows*

astro-ph/1911.04510: **Global axisymmetric simulations of photoevaporation and magnetically driven protoplanetary disk winds** by *Peter J. Rodenkirch et al.*

astro-ph/1911.04589: **Detailed Model of the Growth of Fluffy Dust Aggregates in a Protoplanetary Disk: Effects of Nebular Conditions** by *C. Xiang et al.*

astro-ph/1911.04598: **The Compositional Diversity of Low-Mass Exoplanets** by *Daniel Jontof-Hutter*

astro-ph/1911.04745: **Revisited Mass-Radius relations for exoplanets below 120 Earth masses** by *J.F. Otegi, F. Bouchy, R. Helled*

astro-ph/1911.04793: **HD 117214 debris disk: scattered light images and constraints on the presence of planets** by *N. Engler et al.*

astro-ph/1911.04814: **New constraints on the HR 8799 planetary system from mid-infrared direct imaging** by *D. J. M. Petit dit de la Roche et al.*

astro-ph/1911.05025: **Gravity-Darkening Analysis of Misaligned Hot Jupiter MASCARA-4 b** by *John P. Ahlers et al.*

astro-ph/1911.05131: **Modelling the distributions of white dwarf atmospheric pollution: a low Mg abundance for accreted planetesimals?** by *Samuel G. D. Turner, Mark C. Wyatt*

astro-ph/1911.05150: **TESS Reveals HD 118203 b to be a Transiting Planet** by *Joshua Pepper et al.*

astro-ph/1911.05158: **Cloudlet capture by Transitional Disk and FU Orionis stars** by *Cornelis Petrus Dullemond et al.*

astro-ph/1911.05179: **WASP-52b. The effect of starspot correction on atmospheric retrievals** by *Giovanni Bruno et al.*

astro-ph/1911.05471: **Tracing The Physical Conditions of Planet Formation with Molecular Excitation** by *Richard Teague*

astro-ph/1911.05574: **TOI-677 b: A Warm Jupiter (P=11.2d) on an eccentric orbit transiting a late F-type star** by *Andrés Jordán et al.*

astro-ph/1911.05577: **Constraining the magnitude of climate extremes from time-varying instellation on a circumbinary terrestrial planet** by *Jacob Haqq-Misra et al.*

astro-ph/1911.05597: **How to Characterize Habitable Worlds and Signs of Life** by *L. Kaltenegger*

astro-ph/1911.05744: **Zodiacal Exoplanets in Time (ZEIT) IX: a flat transmission spectrum and a highly eccentric orbit for the young Neptune K2-25b as revealed by Spitzer** by *Pa Chia Thao et al.*

astro-ph/1911.05760: **Flyby-induced misalignments in planet-hosting discs** by *Rebecca Nealon, Nicolás Cuello, Richard Alexander*

astro-ph/1911.05830: **Investigating the Planet-Metallicity Correlation for Hot Jupiters** by *Ares Osborn, Daniel Bayliss*

astro-ph/1911.05902: **Pre-discovery Activity of New Interstellar Comet 2I/Borisov Beyond 5 AU** by *Quanzhi Ye et al.*

astro-ph/1911.06250: **Debris disks around stars in the NIKA2 era** by *J.-F. Lestrade et al.*

astro-ph/1911.06271: **Sublimation of Water Ice from a Population of Large, Long-Lasting Grains Near the Nucleus of 2I/Borisov?** by *Zdenek Sekanina*
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