ExoPlanet News
An Electronic Newsletter

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Contents

1 Editorial

Welcome to the ninety ninth edition of ExoPlanet News. As you may recall, in the last edition I announced that I would be standing down as editor of the newsletter after edition number 100, and called for volunteers to take over the editorship. I'm sorry to say that no-one has come forward to volunteer for the position, so the next edition will be the last one.

In the meantime, please enjoy this penultimate edition, with the usual mix of content.

Best wishes
Andrew Norton
The Open University

2 Abstracts of refereed papers

Low probability of tropical cyclones on ocean planets in the habitable zones of M dwarfs

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Icarus, in press

The genesis potential index (GPI) of tropical cyclones (TC) on ocean planets in the habitable zones of M dwarfs is analyzed based on 3D GCM simulations. We found that GPI on these planets are smaller than those in TC basins on the Earth mainly because of slow rotation of such planets. GPI's on exoplanets with eccentric orbits are strong function of time with values generally greater than those on circular orbits. Future high res- olution models are needed to better understand whether TCs could form on ocean exoplanets, and what their potential intensities and distributions might be.

Download/Website: https://doi.org/10.1016/j.icarus.2017.08.007

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Astrometric Constraints on the Masses of Long-Period Gas Giant Planets in the TRAPPIST-1 Planetary System

Alan P. Boss[1], *Alycia J. Weinberger*[1], *Sandra A. Keiser*[1], *Tri L. Astraatmadja*[1], *Guillem Anglada-Escude*[2], *and Ian B. Thompson*[3]

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The Astrophysical Journal, in press

Transit photometry of the M8V dwarf star TRAPPIST-1 (2MASS J23062928-0502285) has revealed the presence of at least seven planets with masses and radii similar to that of Earth orbiting at distances that might allow liquid water to be present on their surfaces. We have been following TRAPPIST-1 since 2011 with the CAPSCam astrometric camera on the 2.5-m du Pont telescope at the Las Campanas Observatory in Chile. In 2016 we noted that TRAPPIST-1 lies slightly farther away than previously thought, at 12.49 pc, rather than 12.1 pc. Here we examine fifteen epochs of CAPSCam observations of TRAPPIST-1, spanning the five years from 2011 to 2016, and obtain a revised trigonometric distance of 12.56 ± 0.12 pc. The astrometric data analysis pipeline shows no evidence for a long-period astrometric wobble of TRAPPIST-1. After proper motion and parallax are removed, residuals at the level of ± 1.3 millarcsec (mas) remain. The amplitude of these residuals constrains the masses of any long-period gas giant planets in the TRAPPIST-1 system: no planet more massive than $\sim 4.6 M_{Jup}$ orbits with a 1 yr period, and no planet more massive than $\sim 1.6 M_{Jup}$ orbits with a 5 yr period. Further refinement of the CAPSCam data analysis pipeline, combined with continued CAPSCam observations, should either detect any long-period planets, or put an even tighter constraint on these mass upper limits.

Download/Website: https://home.dtm.ciw.edu/users/boss/ftp/TRAPPIST-1.pdf

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High signal-to-noise spectral characterization of the planetary-mass object HD 106906 b

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Astronomy & Astrophysics, in press (arXiv:1708.05747)

We spectroscopically characterize the atmosphere of HD 106906 b, which is a young low-mass companion near the deuterium burning limit. The wide separation from its host star of $7.1''$ makes it an ideal candidate for high S/N and high-resolution spectroscopy. We aim to derive new constraints on the spectral type, effective temperature, and luminosity of HD 106906 b and also to provide a high S/N template spectrum for future characterization of extrasolar planets. We obtained 1.1–2.5 μm integral field spectroscopy with the VLT/SINFONI instrument with a spectral resolution of R≈2000–4000. New estimates of the parameters of HD 106906 b are derived by analyzing spectral features, comparing the extracted spectra to spectral catalogs of other low-mass objects, and fitting with theoretical isochrones. We identify several spectral absorption lines that are consistent with a low mass for HD 106906 b. We derive a new spectral type of L1.5 $\pm$ 1.0, which is one subclass earlier than previous estimates. Through comparison with other young low-mass objects, this translates to a luminosity of $\log(L/L_\odot) = -3.65 \pm 0.08$ and an effective temperature of $T_{\rm eff} = 1820 \pm 240$ K. Our new mass estimates range between $M = 11.9^{+1.7}_{-0.8}\,M_{\rm Jup}$ (hot start) and $M = 14.0^{+0.2}_{-0.5}\,M_{\rm Jup}$ (cold start). These limits take into account a possibly finite formation time, i.e., HD 106906 b is allowed to be 0–3 Myr younger than its host star. We exclude accretion onto HD 106906 b at rates $\dot{M} > 4.8 \times 10^{-10}\,M_{\rm Jup}{\rm yr}^{-1}$ based on the fact that we observe no hydrogen (Paschen-β, Brackett-γ) emission. This is indicative of little or no circumplanetary gas. With our new observations, HD 106906 b is the planetary-mass object with one of the highest S/N spectra yet. We make the spectrum available for future comparison with data from existing and next-generation (e.g., ELT and JWST) spectrographs.

Download/Website: `http://arxiv.org/abs/1708.05747`

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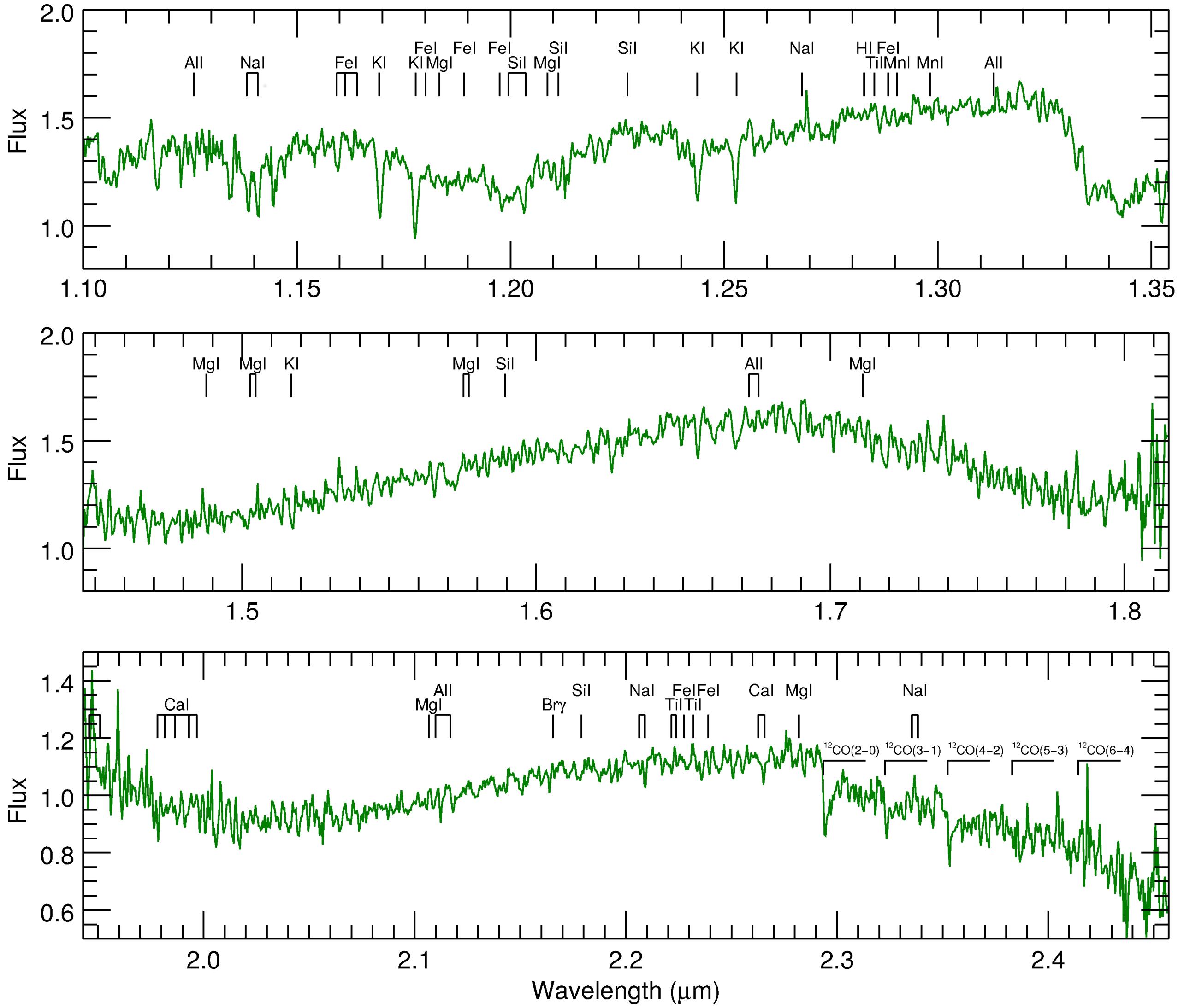

Figure 1: (Daemgen et al.) Fully reduced and extracted spectra of HD 106906b in J (top), H (middle), and K band (bottom). Spectra are binned in wavelength by a factor of 2.

The chemistry of protoplanetary fragments formed via gravitational instabilities

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Monthly Notices of the Royal Astronomical Society, in press (arXiv:1708.01815)

In this paper, we model the chemical evolution of a 0.25 $M_\odot$ protoplanetary disc surrounding a 1 $M_\odot$ star that undergoes fragmentation due to self-gravity. We use Smoothed Particle Hydrodynamics including a radiative transfer scheme, along with time-dependent chemical evolution code to follow the composition of the disc and resulting fragments over approximately 4000 yrs. Initially, four quasi-stable fragments are formed, of which two are eventually disrupted by tidal torques in the disc. From the results of our chemical modelling, we identify species that are abundant in the fragments (e.g. H_2O, H_2S, HNO, N_2, NH_3, OCS, SO), species that are abundant in the spiral shocks within the disc (e.g. CO, CH_4, CN, CS, H_2CO), and species which are abundant in the circumfragmentary material (e.g. HCO^+). Our models suggest that in some fragments it is plausible for grains to sediment to the core before releasing their volatiles into the planetary envelope, leading to changes in, e.g., the C/O ratio of the gas and ice components. We would therefore predict that the atmospheric composition of planets generated by gravitational instability should not necessarily follow the bulk chemical composition of the local disc material.

Download/Website: `https://arxiv.org/abs/1708.01815`

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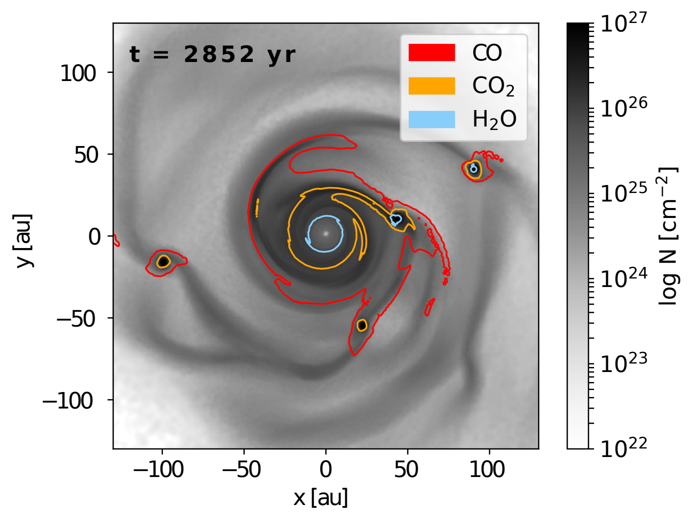

Figure 2: (Ilee et al.) Evolution of the total column density of the disc (grey scale) overlaid with the "snow lines" of CO (red), CO_2 (orange) and H_2O (blue). Before onset of the global instabilities, the disc shows the expected concentric ringed structure of snow lines. However, significant deviations from this are seen once the spiral shocks set in and fragmentation begins. In particular, the fragments develop concentric snow lines themselves.

The spatial distribution of carbon dust in the early solar nebula and the carbon content of planetesimals

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Astronomy & Astrophysics, in press

A high fraction of carbon bound in solid carbonaceous material is observed to exist in bodies formed in the cold outskirts of the solar nebula, while bodies in the terrestrial planets region contain nearly none. We study the fate of the carbonaceous material during the spiral-in of matter as the sun accretes matter from the solar nebula. From observational data on the composition of the dust component in comets and interplanetary dust particles, and from data on pyrolysis experiments, we construct a model for the composition of the pristine carbonaceous material in the outer parts of the solar nebula. We study the pyrolysis of the refractory and volatile organic component and the concomitant release of high-molecular-weight hydrocarbons under quiescent conditions of disk evolution where matter migrates inwards. We also study the decomposition and oxidation of the carbonaceous material during violent flash heating events, which are thought to be responsible for the formation of chondrules. It is found that the complex hydrocarbon components are removed from the solid disk matter at temperatures between 250 and 400 K, while the amorphous carbon component survives up to 1200 K. Without efficient carbon destruction during flash-heating associated with chondrule formation the carbon abundance of terrestrial planets, except for Mercury, would be not as low as it is found in cosmochemical studies. Chondrule formation seems to be a process that is crucial for the carbon-poor composition of the material of terrestrial planets.

Download/Website: `https://arxiv.org/abs/1707.07611`

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A *Kepler* Study of Starspot Lifetimes with Respect to Light Curve Amplitude and Spectral Type

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Monthly Notices of the Royal Astronomical Society, in press (arXiv:1707.08583)

Wide-field high precision photometric surveys such as *Kepler* have produced reams of data suitable for investigating stellar magnetic activity of cooler stars. Starspot activity produces quasi-sinusoidal light curves whose phase and amplitude vary as active regions grow and decay over time. Here we investigate, firstly, whether there is a correlation between the size of starspots - assumed to be related to the amplitude of the sinusoid - and their decay timescale and, secondly, whether any such correlation depends on the stellar effective temperature. To determine this, we computed the autocorrelation functions of the light curves of samples of stars from *Kepler* and fitted them with apodised periodic functions. The light curve amplitudes, representing spot size were measured from the root-mean-squared scatter of the normalised light curves. We used a Monte Carlo Markov Chain to measure the periods and decay timescales of the light curves. The results show a correlation between the decay time of starspots and their inferred size. The decay time also depends strongly on the temperature of the star. Cooler stars have spots that last much longer, in particular for stars with longer rotational periods. This is consistent with current theories of diffusive mechanisms causing starspot decay. We also find that the Sun is not unusually quiet for its spectral type - stars with solar-type rotation periods and temperatures tend to have (comparatively) smaller starspots than stars with mid-G or later spectral types.

Download/Website: `arxiv.org/abs/1707.08583`

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Self-consistent atmosphere modeling with cloud formation for low-mass stars and exoplanets

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Astronomy & Astrophysics, accepted (arXiv:1708.06976)

Context: Low-mass stars and extrasolar planets have ultra-cool atmospheres where a rich chemistry occurs and clouds form. The increasing amount of spectroscopic observations for extrasolar planets requires self-consistent model atmosphere simulations to consistently include the formation processes that determine cloud formation and their feedback onto the atmosphere.
Aims: Complement the MARCS model atmosphere suit with simulations applicable to low-mass stars and exoplanets in preparation of E-ELT, JWST, PLATO and other upcoming facilities.
Methods: The MARCS code calculates stellar atmosphere models, providing self-consistent solutions of the radiative transfer and the atmospheric structure and chemistry. We combine MARCS with a kinetic model that describes cloud formation in ultra-cool atmospheres (seed formation, growth/ evaporation, gravitational settling, convective mixing, element depletion).
Results: We present a small grid of self-consistently calculated atmosphere models for $T_{\rm eff} = 2000 - 3000$ K with solar initial abundances and $\log(g) = 4.5$. Cloud formation in stellar and sub-stellar atmospheres appears for $T_{\rm eff} < 2700$ K and has a significant effect on the structure and the spectrum of the atmosphere for $T_{\rm eff} < 2400$ K. We have compared the synthetic spectra of our models with observed spectra and found that they fit the spectra of mid to late type M-dwarfs and early type L-dwarfs well. The geometrical extension of the atmospheres (at $\tau = 1$) changes with wavelength resulting in a flux variation of $\sim$10%. This translates into a change in geometrical extension of the atmosphere of about 50 km, which is the quantitative basis for exoplanetary transit spectroscopy. We also test DRIFT-MARCS for an example exoplanet and demonstrate that our simulations reproduce the Spitzer observations for WASP-19b rather well for $T_{\rm eff} = 2600$ K, $\log(g) = 3.2$ and solar abundances. Our model points at an exoplanet with a deep cloud-free atmosphere with a substantial day-night energy transport and no temperature inversion.

Download/Website: `https://arxiv.org/abs/1708.06976`

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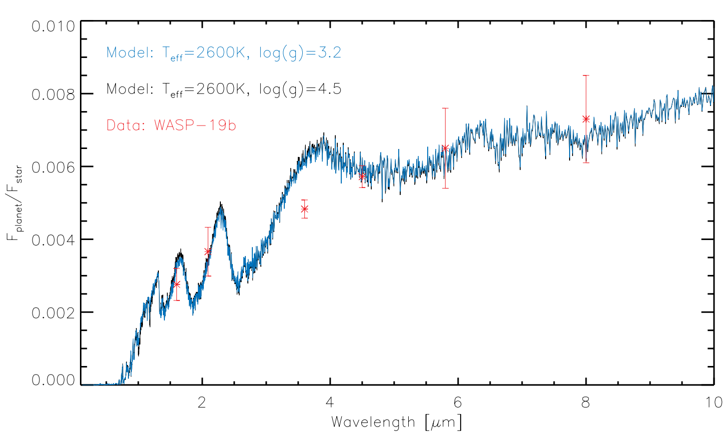

Figure 3: (Juncher et al.) The best-fit synthetic transit spectra for WASP-19b for $\log(g) = 4.5$ (blue) and $\log(g) = 3.2$ (green), based on DRIFT-MARCS model atmosphere simulations for the star ($T_{\rm eff} = 5475$ K, $\log(g) = 4.43$, [Fe/H] = 0.02) and for the planet. The Spitzer data points are plotted in red. We derive that the temperature of the planet is $T_{\rm eff} = 2600$ K.

Dynamical rearrangement of super-Earths during disk dispersal II. Assessment of the magnetospheric rebound model for planet formation scenarios

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Astronomy & Astrophysics, in press (arXiv:1708.01275)

Context. The Kepler mission has provided a large sample to statistically analyze the orbital properties of the super-Earth planet population. We hypothesize that these planets formed early and consider the problem of matching planet formation theory to the current orbital configurations. Two scenarios – disk migration and in-situ formation – have been proposed to explain the origin of these planets. In the migration scenario, planets migrate inward to the inner disk due to planet-disk interaction, whereas in the in-situ scenario planets assemble locally. Therefore, planets formed by migration are expected to end up in resonances, whereas those formed in-situ are expected to stay in short period ratios and in non-resonant orbits. Both predictions are at odds with observations. **Aims**. We investigate whether a preferred formation scenario can be identified through a comparison between the magnetospheric rebound model and the Kepler data. **Methods**. We conduct N-body simulations of two-planet systems during the disk dispersal phase. Several distributions of model parameters are considered and we make a statistical comparison between the simulations and the Kepler observations. **Results**. Comparing the migration and the in-situ scenarios, we find that magnetospheric rebound tends to erase the difference in the orbital configuration that was initially presented. After disk dispersal, not all planets are in resonance in the migration scenario, whereas planets do not remain in compact configurations in the in-situ scenario. In both scenarios, the orbits of planets increase with the cavity expansion, and their period ratios have a wider distribution. **Conclusions**. From a statistical perspective, the magnetospheric rebound model reproduces several observed properties of Kepler planets, such as the fact that a significant number of planets are not in resonances and planet pairs can end up at large period ratios. The disparity in orbital configuration between the two formation scenarios is substantially reduced after disk dispersal.

Download/Website: `https://arxiv.org/abs/1708.01275`

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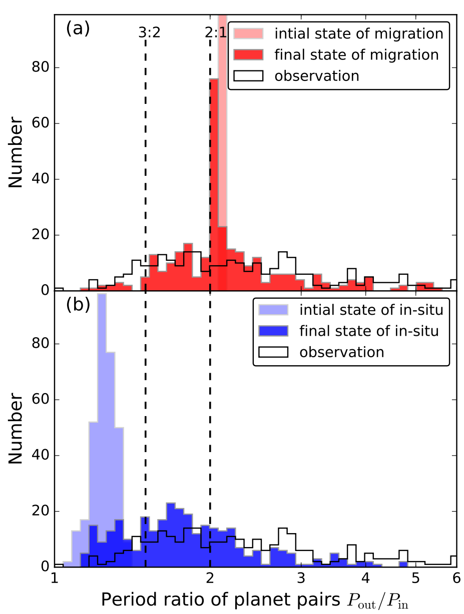

Figure 4: (Liu & Ormel) Histogram of the outer-to-inner planet period ratio. The upper and lower panel show the results from the migration (red) and the *in-situ* (blue) scenario, respectively. In each scenario, both the initial (light) and final states (dark) of the simulations are given. The black line is the observation data for comparison. Vertical lines indicate the 2:1 and 3:2 MMRs.

Using polarimetry to retrieve the cloud coverage of Earth-like exoplanets

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Astronomy & Astrophysics, in press, arXiv:1708.07009

Clouds have already been detected in exoplanetary atmospheres. They play crucial roles in a planet's atmosphere and climate and can also create ambiguities in the determination of atmospheric parameters such as trace gas mixing ratios. Knowledge of cloud properties is required when assessing the habitability of a planet.
Aims. We aim to show that various types of cloud cover such as polar cusps, subsolar clouds, and patchy clouds on Earth-like exoplanets can be distinguished from each other using the polarization and flux of light that is reflected by the planet.
Methods. We have computed the flux and polarization of reflected starlight for different types of (liquid water) cloud covers on Earth-like model planets using the adding-doubling method, that fully includes multiple scattering and polarization. Variations in cloud-top altitudes and planet-wide cloud cover percentages were taken into account.
Results. We find that the different types of cloud cover (polar cusps, subsolar clouds, and patchy clouds) can be distinguished from each other and that the percentage of cloud cover can be estimated within 10%.
Conclusions. Using our proposed observational strategy, one should be able to determine basic orbital parameters of a planet such as orbital inclination and estimate cloud coverage with reduced ambiguities from the planet's polarization signals along its orbit.

Download/Website: `http://arxiv.org/abs/1708.07009`

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Red-edge position of habitable exoplanets around M-dwarfs

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Scientific Reports, published online (doi:10.1038/s41598-017-07948-5)

One of the possible signs of life on distant habitable exoplanets is the red-edge, which is a rise in the refectivity of planets between visible and near-infrared (NIR) wavelengths. Previous studies suggested the possibility that the red-edge position for habitable exoplanets around M-dwarfs may be shifted to a longer wavelength than that for Earth. We investigated plausible red-edge position in terms of the light environment during the course of the evolution of phototrophs. We show that phototrophs on M-dwarf habitable exoplanets may use visible light when they frst evolve in the ocean and when they frst colonize the land. The adaptive evolution of oxygenic photosynthesis may eventually also use NIR radiation, by one of two photochemical reaction centers, with the other center continuing to use visible light. These gtwo-colorh reaction centers can absorb more photons, but they will encounter difculty in adapting to drastically changing light conditions at the boundary between land and water. NIR photosynthesis can be more productive on land, though its evolution would be preceded by the Earth-type vegetation. Thus, the red-edge position caused by photosynthetic organisms on habitable M-dwarf exoplanets could initially be similar to that on Earth and later move to a longer wavelength.

Download/Website: `https://www.nature.com/articles/s41598-017-07948-5`

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MASCARA-1 b: A hot Jupiter transiting a bright $m_V = 8.3$ A-star in a misaligned orbit

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Astronomy & Astrophysics, in press (arxiv:1707.04262)

We report the discovery of MASCARA-1 b, the first exoplanet discovered with the Multi-site All-Sky CAmeRA (MASCARA). It is a hot Jupiter orbiting a bright $m_V = 8.3$, rapidly rotating $(v \sin i_\star > 100\ \mathrm{km\,s^{-1}})$ A8 star with a period of $2.148780 \pm 8 \times 10^{-6}$ days. The planet has a mass and radius of $3.7 \pm 0.9\ \mathrm{M_{Jup}}$ and $1.5 \pm 0.3\ \mathrm{R_{Jup}}$, respectively. As with most hot Jupiters transiting early-type stars we find a misalignment between the planet orbital axis and the stellar spin axis, which may be signature of the formation and migration histories of this family of planets. MASCARA-1 b has a mean density of $1.5 \pm 0.9\ \mathrm{g\,cm^{-3}}$ and an equilibrium temperature of 2570^{+50}_{-30} K, one of the highest temperatures known for a hot Jupiter to date. The system is reminiscent of WASP-33, but the host star lacks apparent delta-scuti variations, making the planet an ideal target for atmospheric characterization. We expect this to be the first of a series of hot Jupiters transiting bright early-type stars that will be discovered by MASCARA.

Download/Website: `https://arxiv.org/abs/1707.04262`

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The critical binary star separation for a planetary system origin of white dwarf pollution

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Monthly Notices of the Royal Astronomical Society, in press (arXiv:1708.05391)

The atmospheres of between one quarter and one half of observed single white dwarfs in the Milky Way contain heavy element pollution from planetary debris. The pollution observed in white dwarfs in binary star systems is, however, less clear, because companion star winds can generate a stream of matter which is accreted by the white dwarf. Here we (i) discuss the necessity or lack thereof of a major planet in order to pollute a white dwarf with orbiting minor planets in both single and binary systems, and (ii) determine the critical binary separation beyond which the accretion source is from a planetary system. We hence obtain user-friendly functions relating this distance to the masses and radii of both stars, the companion wind, and the accretion rate onto the white dwarf, for a wide variety of published accretion prescriptions. We find that for the majority of white dwarfs in known binaries, if pollution is detected, then that pollution should originate from planetary material.

Download/Website: `http://arxiv.org/abs/1708.05391`

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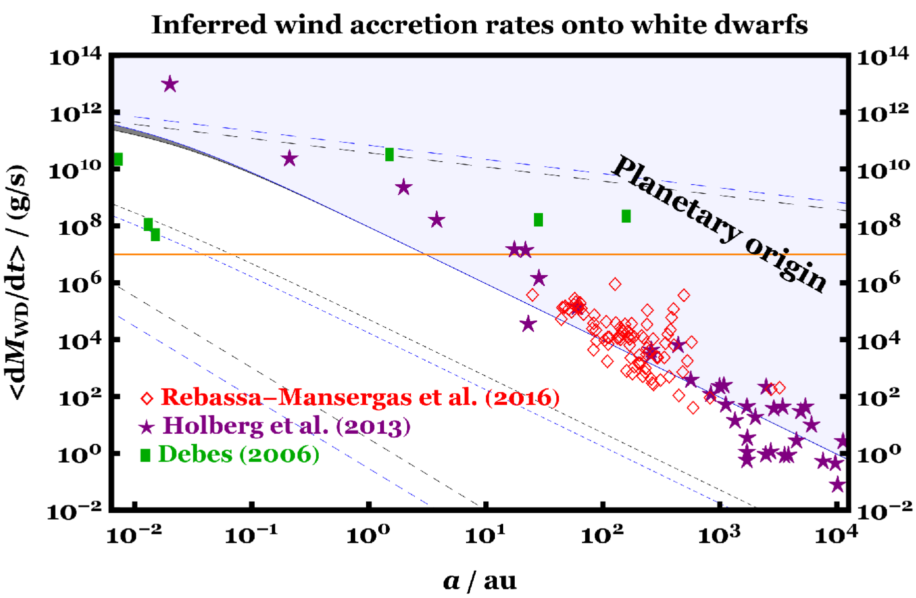

Figure 5: (Veras at al.) Inferred accretion rates onto white dwarfs from main sequence companion winds from three samples: Holberg et al. (2013), Debes (2006), and Rebassa-Mansergas et al. (2016a). The solid and dashed pairs of curves correspond to the accretion prescriptions in Figs. 1-2 and approximate the boundaries above which (in the shaded area for our fiducial prescription) newly observed polluted white dwarfs would likely have remnant planetary systems, assuming $M_{\rm WD} = 0.6M_{\odot}$, $\dot{M}_{\rm MS} = 10^{-12}$ g/s, (black: $M_{\rm MS} = 0.6M_{\odot}$, $R_{\rm MS} = 0.6R_{\odot}$) and (blue: $M_{\rm MS} = 0.2M_{\odot}$, $R_{\rm MS} = 0.2R_{\odot}$). The orange horizontal curve roughly represents the current accretion rate detection limit of 10^7 g/s. Consequently, if pollution is detected in a white dwarf which is separated from a binary companion by more than a few au, then very likely the pollution originates from a planetary system.

3 Jobs and Positions

PhD positions: International Max Planck Research School for Solar System Science at the University of Göttingen

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[2] in collaboration with Georg-August-University of Göttingen, Germany

Location: Göttingen, Date: Review of applications begins on 15 November 2017 for starting dates in 2018

The Solar System School invites applications for PhD positions in Solar System Science.
The International Max Planck Research School for Solar System Science at the University of Göttingen (”Solar System School”) offers a research-oriented doctoral program covering the physical aspects of Solar system science. It is jointly run by the Max Planck Institute for Solar System Research (MPS) and the University of Göttingen. Research at the MPS covers three main research areas: ”Sun and Heliosphere”, ”Solar and Stellar Interiors” and ”Planets and Comets”. The open PhD projects also include topics in extra-solar planet research, with one focus on asteroseismology of exoplanet host stars. The Max Planck Institute for Solar System Research hosts the Data Center for the PLATO mission, recently adopted by ESA.
Solar System School students collaborate with leading scientists in these fields and graduates are awarded a doctoral degree from the renowned University of Göttingen or, if they choose, another university.
The Solar System School is open to students from all countries and offers an international three-year PhD program in an exceptional research environment with state-of-the-art facilities on the Göttingen Campus. Successful applicants will be offered a three-year doctoral support contract as well as postdoc wrap-up funding.
The language of the structured graduate program is English, with complimentary German language courses offered (optional). The program includes an inspiring curriculum of scientific lectures and seminars as well as advanced training workshops and provides relocation costs and travel funds to attend international conferences.
Applicants to the Solar System School should have a keen interest in Solar system science and a record of academic excellence. They must have, or must be about to obtain, an M.Sc. degree or equivalent in physics, earth science or a related field, including a written Masters thesis, and must document a good command of the English language.
Review of applications for a starting date of September 2018 will begin on 15 November 2017, but other starting times are also negotiable. The positions are awarded on a competitive basis.
The Solar System School is committed to diversity. The MPS is an equal opportunity employer and places particular emphasis on providing career opportunities for women. Applications of people with disabilities are encouraged and will be favored in case of comparable qualifications.

Applications should be submitted online through the application portal, following the instructions at `http://www.mps.mpg.de/phd/applynow`

Download/Website: `http://www.solar-system-school.de`
`https://www.mps.mpg.de/phd/solar-system-school-call-2017.pdf`
`https://www.mps.mpg.de/phd/solar-system-school-poster-2017.pdf`

Contact: `info@solar-system-school.de`

Postdoctoral positions in analysis of JWST observations of exoplanets, brown dwarfs, and protostars

Tom Greene
Ames Research Center, MS 245-6, Moffett Field, CA 94035, USA

NASA Ames Research Center, Mountain View, CA, USA, summer or early fall 2018

NASA Ames Research Center has postdoctoral positions available in the area of characterization of exoplanet, brown dwarf, and protostellar atmospheres with James Webb Space Telescope (JWST) spectroscopic and photometric data. We expect to offer one position in the analysis of time-series observations of transiting planets and one position in the analysis of protostar and brown dwarf spectra. The data will be obtained via guaranteed-time observations (GTO) and possibly general observer (GO) observations that are scheduled to start in April 2019.

The exoplanet postdoc will work closely with Tom Greene at NASA Ames in analyzing JWST NIRCam and MIRI transit and secondary eclipse spectra and images of warm planets that mostly have masses between Neptune and Jupiter. The primary duty is to optimize the data reduction by applying sophisticated de-correlation and / or statistical (i.e. Gaussian process) techniques. Experience in optimizing data reduction pipelines, systematic noise removal, and analysis of high precision time-series exoplanet data using Python is required.

The second postdoc will work with NASA Ames researchers Tom Roellig and Tom Greene in the analysis of brown dwarf and Class 0 protostar spectra, respectively. This analysis will largely consist of estimation of model parameters via statistical retrieval techniques (e.g., MCMC, MultiNest). We expect that the standard JWST pipelines will deliver data with sufficient quality for this task. Experience in data reduction and statistical analysis of stellar, brown dwarf, protostellar, or other similar infrared spectra using Python is required.

Both positions will also require working effectively with modest-sized teams distributed in the US and Europe. There will be opportunities for independent research, and we would particularly encourage and support work on related JWST GO proposals. Funding is available for research travel. We would like the positions to commence in the summer of 2018, several months before the JWST launch in October. We expect that each position will be funded for 2 years or more.

Applications are due to the NASA Postdoctoral Program (NPP) by November 1. Interested researchers should contact Tom Greene at least 3 weeks before this date to discuss suitability and the NPP application proposal.

Download/Website: `Exoplanet position: : https://npp.usra.edu/opportunities/details/?ro=19114`
`Brown dwarf / protostar position: https://npp.usra.edu/opportunities/details/?ro=19125`

Contact: `tom.greene@nasa.gov`

Associate/Assistant Professor position in Exoplanets

Stéphane Udry
Observatoire astronomique de l'Université de Genève, 51 ch. des Maillettes, CH-1290 Versoix, Switzerland

University of Geneva (Geneva Observatory), January 2018 or upon mutual agreement

Job Description: The Faculty of Sciences of the University of Geneva is opening an Associate Professor or Assistant Professor (tenure track) position at the Department of Astronomy **in the domain of climatology and habitability of exoplanets**.

Institute: The Department of Astronomy of the University of Geneva offers a modern and vibrant scientific environment with world-renown researchers in the domains of stellar physics, exoplanets, galactic and extragalactic astrophysics, observational cosmology and high-energy astrophysics. It is actively involved in most of the major missions of the European Space Agency and several instrumentation projects at the European Southern Observatory.

Assignment: The full-time appointment involves lectureship in the domain of exoplanets (6 hours/week), and supervision of bachelor, master, and PhD theses. The successful candidate will be expected to teach a course on planetary atmospheres and climate.
The successful candidate will be able to develop their own research group and will lead the local research activities in the field of climate sciences applied to planets and exoplanets, based on a strong theoretical expertise and in connection with state-of-the-art observations. The candidate is also expected to play a leading role in characterizing the habitability of exoplanetary systems.
The Department of Astronomy is strongly committed to hire an excellent team player, who is expected to develop fruitful collaborations with faculty members of the local team (http://www.exoplanets.ch), as well as collaborations between the Department of Astronomy and the Institute of Environmental Sciences of the University of Geneva, the Swiss institutions in PlanetS, and external partners.

Academic Title Requested: PhD or equivalent. Experience in research supervision and teaching. Publications in high-ranked international journals.

Starting Date: 01.01.2018, or upon mutual agreement.

Applications should be submitted exclusively on-line to the following address:
https://jobs.unige.ch/www/wd_portal.show_job?p_web_site_id=1&p_web_page_id=28422
before September 15th, 2017 (00:00 Geneva time). Applications sent by e-mail shall not be accepted.

Download/Website: `https://jobs.unige.ch/www/wd_portal.show_job?p_web_site_id=1&p_web_page_id=2842`

Contact: `scienceopenings@unige.ch`

4 Conference announcements

Merging giant-star asteroseismology with the fate of extrasolar planetary systems: An RAS Specialist Discussion Meeting

Tiago Campante[1], *Dimitri Veras*[2]
[1] University of Porto, Portugal
[2] University of Warwick, UK

London, UK, 9 March 2018

Although stars spend a significant fraction of their lives on the main sequence, they undergo their most dramatic physical changes during post-main-sequence evolution. The fates of their planetary systems may be similarly violent. Hence, the simultaneous study of both planets and stars along the latter's subgiant and giant-branch phases is capable of providing constraints on tidal, mass-loss and radiative processes, as well as invaluable insight into the processes of planet formation and evolution.

Over 100 planets and several debris discs are now known to orbit subgiant and giant stars, thereby providing constraints on their past and future evolution. Further, the absence of planets close to other giant stars signifies destructive processes at work. A critical restriction on the nature and timescale of these destructive processes is stellar age, a previously poorly constrained property.

Fortunately, new insights on the theory of stellar evolution and stellar interiors physics have been made possible by asteroseismology, the study of stars by the observation of their natural, resonant oscillations. Asteroseismology is proving to be particularly significant for the study of evolved stars, namely, subgiant and red-giant stars. These stars exhibit solar-like oscillations. The information contained in solar-like oscillations allows fundamental stellar properties (e.g., mass, radius and age) to be precisely determined, while also allowing the internal stellar structure to be constrained to unprecedented levels. As a result, asteroseismology is quickly maturing into a powerful tool whose impact is being felt more widely across different domains of astrophysics. A noticeable example is the synergy between asteroseismology and exoplanetary science.

During this RAS Specialist Discussion Meeting we will review our current understanding of the evolution and fate of extrasolar planetary systems during the subgiant and giant stellar evolutionary phases. Furthermore, by bringing together members of the leading UK exoplanets and asteroseismology communities, we expect to establish a roadmap for the effective and synergetic exploitation of the wealth of space-based data that will soon become available to both communities. In this regard, we highlight the upcoming NASA TESS and ESA CHEOPS satellites, both with launches scheduled for 2018, thus stressing the timeliness of this meeting.

Download/Website: `https://sites.google.com/view/ras-evolsystems`

Contact: `campante@bison.ph.bham.ac.uk`

Water during planet formation and evolution

Julia Venturini
University of Zurich, Switzerland

Zurich, Switzerland, 12-16 February 2018

TOPICS:
Water and The ISM and protoplanetary disk; Dust, ice and planetesimals; Evidence from the meteoritic record; Laboratory experiments; Ice lines and disk dynamics; Solar System formation; Gas & Ice giant planets; Protoplanetary collisions; Mantle-atmosphere feedback; Observational prospects; Population synthesis; Biomarkers & 'habitability'.

CONFIRMED INVITED SPEAKERS:
Til Birnstiel (LMU Munich); Ilsedore Cleeves (CfA Harvard); Jay Farihi (University College London); Keiko Hamano (ELSI, Tokyo Tech.); Alessandro Morbidelli (Nice Observatory); Lena Noack (FU Berlin); Chris Ormel (University of Amsterdam); Laura Schaefer (Arizona State University); Alice Stephant (Open University).

MEETING ORGANIZERS:
Joanna Drazkowska (University of Zurich); Tim Lichtenberg (ETH Zurich); Caroline Dorn (University of Bern); Julia Venturini (University of Zurich).

SCIENTIFIC ADVISORY BOARD:
Yann Alibert (University of Bern); Ravit Helled (University of Zurich); Anders Johansen (Lund University); Martin Jutzi (University of Bern); Alessandro Morbidelli (Nice Observatory); Sascha Quanz (ETH Zurich); Maria Schnbchler (ETH Zurich); Ewine van Dishoeck (Leiden University).

IMPORTANT DATES:
Registration & Abstract submission deadline: November 15, 2017.
Program announcement: Early December 2017.
Workshop: February 12-16, 2017.

Download/Website: `https://waterzurich.github.io`
Contact: `julia@physik.uzh.ch`

22nd International Microlensing Conference

Calen Henderson
Caltech / IPAC, Pasadena, California, USA

University of Auckland, New Zealand, Thursday, 25 January 2018–Sunday, 28 January 2018

Registration and abstract submission are now open for the 22nd International Microlensing Conference, which will take place at the University of Auckland in New Zealand from Thursday, 25 January 2018 through Sunday, 28 January 2018. Please note that there will also be a welcome reception on the night of Wednesday, 24 January!

We encourage astronomers with an interest in exoplanets, stellar populations, and compact objects, among other topics, to join us as we highlight recent results in the field and anticipate the challenges over the next decade in advance of WFIRST!

Download/Website: `https://www.physics.auckland.ac.nz/en/about/international-microlensing-confe`

Contact: `chenderson@ipac.caltech.edu`

5 As seen on astro-ph

The following list contains all the entries relating to exoplanets that we spotted on astro-ph during July and August 2017. If you see any that we missed, please let us know and we'll include them in the next issue.

July 2017

astro-ph/1707.00729 : **Global Simulations of the Inner Regions of Protoplanetary Disks with Comprehensive Disk Microphysics** by *Xue-Ning Bai*
astro-ph/1707.00740 : **Hot Start Giant Planets Form With Radiative Interiors** by *David Berardo, Andrew Cumming*
astro-ph/1707.00779 : **A hot Saturn on an eccentric orbit around the giant star EPIC228754001** by *M.I. Jones, et al.*
astro-ph/1707.01096 : **Changes in orientation and shape of protoplanetary discs moving through an ambient medium** by *T.P.G. Wijnen, et al.*
astro-ph/1707.01153 : **TOSC: an algorithm for the tomography of spotted transit chords** by *Gaetano Scandariato*
astro-ph/1707.01174 : **Direct Exoplanet Investigation using Interstellar Space Probes** by *Ian A. Crawford*
astro-ph/1707.01222 : **OGLE-2016-BLG-0693LB: Probing the Brown Dwarf Desert with Microlensing** by *Y.-H. Ryu, et al.*
astro-ph/1707.01413 : **Discovery of a warm, dusty giant planet around HIP65426** by *G. Chauvin, et al.*
astro-ph/1707.01499 : **Physical properties of dusty protoplanetary disks in Lupus: evidence for viscous evolution?** by *M. Tazzari, et al.*
astro-ph/1707.01500 : **MASCARA-2 b: A hot Jupiter transiting a mV=7.6 A-star** by *G.J.J. Talens, et al.*
astro-ph/1707.01518 : **KELT-20b: A giant planet with a period of P 3.5 days transiting the V 7.6 early A star HD 185603** by *Michael B. Lund, et al.*
astro-ph/1707.01534 : **Detection of Water Vapor in the Thermal Spectrum of the Non-Transiting Hot Jupiter upsilon Andromedae b** by *Danielle Piskorz, et al.*
astro-ph/1707.01612 : **The evidence of radio polarization induced by the radiative grain alignment and self-scattering of dust grains in a protoplanetary disk** by *Akimasa Kataoka, et al.*
astro-ph/1707.01628 : **Hydrodynamics of Collisions Between Sub-Neptunes** by *Jason Hwang, et al.*
astro-ph/1707.01827 : **Understanding stellar activity-induced radial velocity jitter using simultaneous K2 photometry and HARPS RV measurements** by *M. Oshagh, et al.*
astro-ph/1707.01942 : **The Densities of Planets in Multiple Stellar Systems** by *E. Furlan, S.B. Howell*
astro-ph/1707.02107 : **Radio Exploration of Planetary Habitability: Conference Summary** by *T. Joseph W. Lazio et al.*
astro-ph/1707.02175 : **Exoplanets and SETI** by *Jason T. Wright*
astro-ph/1707.02321 : **Dust Density Distribution and Imaging Analysis of Different Ice Lines in Protoplanetary Disks** by *P. Pinilla, et al.*
astro-ph/1707.02906 : **The effect of close-in giant planets' evolution on tidal-induced migration of exomoons** by *Jaime A. Alvarado, Jorge I. Zuluaga, Mario Sucerquia*
astro-ph/1707.02996 : **Physical constraints on the likelihood of life on exoplanets** by *Manasvi Lingam, Abraham Loeb*
astro-ph/1707.03026 : **Lidov-Kozai stability regions in the alpha Centauri system** by *C.A. Giuppone, A.C.M. Correia*
astro-ph/1707.03064 : **Characterizing the Chemistry of Planetary Materials Around White Dwarf Stars** by *B. Zuckerman, E.D. Young*
astro-ph/1707.03345 : **The GTC exoplanet transit spectroscopy survey. VII. An optical transmission spectrum of WASP-48b** by *F. Murgas, et al.*

astro-ph/1707.03730 : **Exoplanet Transits as the Foundation of an Interstellar Communications Network** by *Duncan H Forgan*
astro-ph/1707.04110 : **Dust Growth and Magnetic Fields: from Cores to Disks (even down to Planets)** by *Yasuhiro Hasegawa, Jennifer I-Hsiu Li, Satoshi Okuzumi*
astro-ph/1707.04253 : **The Resilience of Life to Astrophysical Events** by *David Sloan, Rafael Alves Batista, Abraham Loeb*
astro-ph/1707.04262 : **MASCARA-1 b: A hot Jupiter transiting a bright mV=8.3 A-star in a misaligned orbit** by *G.J.J. Talens, et al.*
astro-ph/1707.04292 : **Characterization of the K2-18 multi-planetary system with HARPS: A habitable zone super-Earth and discovery of a second, warm super-Earth on a non-coplanar orbit** by *R. Cloutier, et al.*
astro-ph/1707.04537 : **Mg/Si mineralogical ratio of low-mass planet hosts. Correction for the NLTE effects** by *V. Adibekyan, et al.*
astro-ph/1707.04549 : **EPIC 228813918 b: an Earth-sized planet in a 4.3-hour orbit around an M-dwarf** by *A.M.S. Smith, et al.*
astro-ph/1707.04594 : **Implications of tides for life on exoplanets** by *Manasvi Lingam, Abraham Loeb*
astro-ph/1707.04962 : **Kepler-30: the Cesar of TTV variations** by *Federico Panichi, et al.*
astro-ph/1707.05256 : **M Dwarf Exoplanet Surface Density Distribution: A Log-Normal Fit from 0.07-400 AU** by *Michael R. Meyer et al.*
astro-ph/1707.05790 : **Phase Offsets and the Energy Budgets of Hot Jupiters** by *Joel C. Schwartz, et al.*
astro-ph/1707.06192 : **Pinning down the mass of Kepler-10c: the importance of sampling and model comparison** by *Vinesh Rajpaul, Lars A. Buchhave, Suzanne Aigrain*
astro-ph/1707.06238 : **Orbiting a binary: SPHERE characterisation of the HD 284149 system** by *Mariangela Bonavita, et al.*
astro-ph/1707.06278 : **Models of Warm Jupiter Atmospheres: Observable Signatures of Obliquity** by *Emily Rauscher*
astro-ph/1707.06337 : **Constraining accretion signatures of exoplanets in the TW Hya transitional disk** by *Taichi Uyama, et al.*
astro-ph/1707.06370 : **A Secular Resonant Origin for the Loneliness of Hot Jupiters** by *Christopher Spalding, Konstantin Batygin*
astro-ph/1707.06575 : **Gemini/GMOS Transmission Spectral Survey: Complete Optical Transmission Spectrum of the hot Jupiter WASP-4b** by *C. M. Huitson, et al.*
astro-ph/1707.06701 : **Increased Tidal Dissipation using Realistic Rheological Models: Implications for the Thermal History of Io and Tidally Active Extrasolar Planets** by *Joe P. Renaud, Wade G. Henning*
astro-ph/1707.06820 : **Simulating the Exoplanet Yield of a Space-based MIR Interferometer Based on Kepler Statistics** by *J. Kammerer, S. P. Quanz*
astro-ph/1707.06927 : **Climate diversity on cool planets around cool stars with a versatile 3-D Global Climate Model: the case of TRAPPIST-1 planets** by *Martin Turbet, et al.*
astro-ph/1707.07007 : **Reduced Diversity of Life Around Proxima Centauri and TRAPPIST-1** by *Manasvi Lingam, Abraham Loeb*
astro-ph/1707.07040 : **Exomoon Habitability and Tidal Evolution in Low-Mass Star Systems** by *Rhett R. Zollinger, John C. Armstrong, Ren Heller*
astro-ph/1707.07093 : **HATS-43b, HATS-44b, HATS-45b, and HATS-46b: Four Short Period Transiting Giant Planets in the Neptune-Jupiter Mass Range** by *R. Brahm, et al.*
astro-ph/1707.07148 : **Planet formation and disk-planet interactions** by *Wilhelm Kley*
astro-ph/1707.07197 : **VLA observations of the disk around the young brown dwarf 2MASS J044427+2512** by *L. Ricci, et al.*
astro-ph/1707.07405 : **Extrasolar Planets and Their Host Stars** by *Kaspar von Braun, Tabetha Boyajian*
astro-ph/1707.07521 : **The EBLM Project IV. Spectroscopic orbits of over 100 eclipsing M dwarfs masquerad-**

ing as transiting hot-Jupiters by *Amaury H.M.J. Triaud, et al.*

astro-ph/1707.07634 : **No large population of unbound or wide-orbit Jupiter-mass planets** by *Przemek Mroz, et al.*

astro-ph/1707.07920 : **Candidate exoplanet host HD131399A: a nascent Am star** by *N. Przybilla, P. Aschenbrenner, S. Buder*

astro-ph/1707.07978 : **Centroid vetting of transiting planet candidates from the Next Generation Transit Survey** by *Maximilian N. Gunther, et al.*

astro-ph/1707.07983 : **Radial Velocities as an Exoplanet Discovery Method** by *Jason T. Wright*

astro-ph/1707.07986 : **Statistical-likelihood Exo-Planetary Habitability Index (SEPHI)** by *J.M. Rodriguez Mozos, A. Moya*

astro-ph/1707.08007 : **Disproval of the validated planets K2-78b, K2-82b, and K2-92b** by *J. Cabrera, et al.*

astro-ph/1707.08079 : **Hydrodynamics of embedded planets' first atmospheres - III. The role of radiation transport for super-Earth planets** by *Nicolas P. Cimerman, Rolf Kuiper, Chris W. Ormel*

astro-ph/1707.08127 : **Formation of wide-orbit gas giants near the stability limit in multi-stellar systems** by *Arika Higuchi, Shigeru Ida*

astro-ph/1707.08328 : **Near-UV transit photometry of HAT-P-32 b with the LBT: Silicate aerosols in the planetary atmosphere** by *Matthias Mallonn, Hannah R. Wakeford*

astro-ph/1707.08563 : **HEK VI: On the Dearth of Galilean Analogs in Kepler and the Exomoon Candidate Kepler-1625b I** by *Alex Teachey, David M. Kipping, Allan R. Schmitt*

astro-ph/1707.08583 : **A Kepler Study of Starspot Lifetimes with Respect to Light Curve Amplitude and Spectral Type** by *H.A.C. Giles, A. Collier Cameron, R.D. Haywood*

astro-ph/1707.08596 : **Detecting Proxima b's atmosphere with JWST targeting CO2 at 15 micron using a high-pass spectral filtering technique** by *I. Snellen, et al.*

astro-ph/1707.08703 : **Pupil Masks for Spectrophotometry of Transiting Exoplanets** by *Satoshi Itoh, et al.*

astro-ph/1707.08988 : **Improved torque formula for low and intermediate mass planetary migration** by *Maria Alejandra Jimenez, Frederic S. Masset*

astro-ph/1707.09474 : **Magnetospherically-trapped dust and a possible model for the unusual transits at WD 1145+017** by *J. Farihi, T. von Hippel, J. E. Pringle*

astro-ph/1707.09667 : **The First Planetary Microlensing Event with Two Microlensed Source Stars** by *D.P. Bennett, et al.*

August 2017

astro-ph/1708.00016 : **Trends in Atmospheric Properties of Neptune-Size Exoplanets** by *Ian J. M. Crossfield, Laura Kreidberg*

astro-ph/1708.00022 : **In the crosshair: astrometric exoplanet detection with WFIRST's diffraction spikes** by *Peter Melchior, David Spergel, Arianna Lanz*

astro-ph/1708.00290 : **Migrating Jupiter up to the habitable zone: Earth-like planet formation and water delivery** by *L. A. Darriba, et al.*

astro-ph/1708.00425 : **Dynamics of passing-stars-perturbed binary star systems** by *David Bancelin, Elke Pilat-Lohinger, Birgit Loibnegger*

astro-ph/1708.00450 : **Simulations of Small Solid Accretion onto Planetesimals in the Presence of Gas** by *A. Hughes, A.C. Boley*

astro-ph/1708.00491 : **Insights on the Spectral Signatures of Stellar Activity and Planets from PCA** by *Allen B. Davis, et al.*

astro-ph/1708.00605 : **Classifying Exoplanets with Gaussian Mixture Model** by *Soham Kulkarni, Shantanu Desai*

astro-ph/1708.00633 : **Disintegrating Rocky Exoplanets** by *Rik van Lieshout, Saul Rappaport*

astro-ph/1708.00693 : **WASP-12b: A Mass-Losing Extremely Hot Jupiter** by *Carole A. Haswell* astro-ph/1708.00767 : **Reduced gas accretion on super-Earths and ice giants** by *Michiel Lambrechts, Elena Lega*

astro-ph/1708.00868 : **Characterization of exoplanets from their formation III: The statistics of planetary luminosities** by *C. Mordasini, G.-D. Marleau, P. Molliere*

astro-ph/1708.00896 : **Timing by Stellar Pulsations as an Exoplanet Discovery Method** by *J. J. Hermes*

astro-ph/1708.01076 : **An ultrahot gas-giant exoplanet with a stratosphere** by *Thomas M. Evans, et al.*

astro-ph/1708.01080 : **Satellitesimal Formation via Collisional Dust Growth in Steady Circumplanetary Disks** by *Yuhito Shibaike, et al.*

astro-ph/1708.01275 : **Dynamical rearrangement of super-Earths during disk dispersal II. Assessment of the magnetospheric rebound model for planet formation scenarios** by *Beibei Liu, Chris W. Ormel*

astro-ph/1708.01291 : **Spin-Orbit Misalignments of Three Jovian Planets via Doppler Tomography** by *Marshall C. Johnson, et al.*

astro-ph/1708.01363 : **The language of exoplanet ranking metrics needs to change** by *Elizabeth Tasker, et al.*

astro-ph/1708.01594 : **Effect of stellar wind induced magnetic fields on planetary obstacles of non-magnetized hot Jupiters** by *N. V. Erkaev, et al.*

astro-ph/1708.01616 : **Spatially resolved spectroscopy across stellar surfaces. I. Using exoplanet transits to analyze 3-D stellar atmospheres** by *Dainis Dravins, et al.*

astro-ph/1708.01618 : **Spatially resolved spectroscopy across stellar surfaces. II. High-resolution spectra across HD209458 (G0V)** by *Dainis Dravins, et al.*

astro-ph/1708.01621 : **Core-powered mass loss sculpts the radius distribution of small exoplanets** by *Sivan Ginzburg, Hilke E. Schlichting, Re'em Sari*

astro-ph/1708.01895 : **A Jupiter-mass planet around the K0 giant HD 208897** by *M. Yilmaz, et al.*

astro-ph/1708.02051 : **Color difference makes a difference: four planet candidates around tau Ceti** by *Fabo Feng, et al.*

astro-ph/1708.02200 : **Astrometric Constraints on the Masses of Long-Period Gas Giant Planets in the TRAPPIST-1 Planetary System** by *Alan P. Boss, et al.*

astro-ph/1708.02384 : **1000 AU Exterior Arcs Connected to the Protoplanetary Disk around HL Tau** by *Hsi-Wei Yen, et al.*

astro-ph/1708.02669 : **A differential Least Squares Deconvolution method for high precision spectroscopy of stars and exoplanets I. Application to obliquity measurements of HARPS observations of HD189733b** by *John B. P. Strachan, Guillem Anglada-Escude*

astro-ph/1708.02727 : **OGLE-2016-BLG-0263Lb: Microlensing Detection of a Very Low-mass Binary Companion Through a Repeating Event Channel** by *C. Han, et al.*

astro-ph/1708.02821 : **Exploring Other Worlds: Science Questions for Future Direct Imaging Missions (EXOPAG SAG15 Report)** by *Daniel Apai, et al.*

astro-ph/1708.02945 : **A thermodynamic view of dusty protoplanetary disks** by *Min-Kai Lin, Andrew N. Youdin*

astro-ph/1708.02981 : **Tidal Locking of Habitable Exoplanets** by *Rory Barnes*

astro-ph/1708.03336 : **The HARPS search for southern extra-solar planets XLII. A system of Earth-mass planets around the nearby M dwarf YZ Cet** by *N. Astudillo-Defru, et al.*

astro-ph/1708.03773 : **Red-edge position of habitable exoplanets around M-dwarfs** by *Kenji Takizawa, et al.*

astro-ph/1708.04166 : **The GAPS Project: First Results** by *S. Benatti, et al.*

astro-ph/1708.04239 : **Observing the Atmospheres of Known Temperate Earth-sized Planets with JWST** by *Caroline V. Morley, et al.*

astro-ph/1708.04241 : **Risks for life on habitable planets from superflares of their host stars** by *Manasvi Lingam, Abraham Loeb*

astro-ph/1708.04243 : **How does the shape of the stellar spectrum affect the Raman scattering features in the albedo of exoplanets?** by *Antonija Oklopcic, Christopher M. Hirata, Kevin Heng*

astro-ph/1708.04449 : **Rotation of planet-harbouring stars** by *P. F. L. Maxted*

astro-ph/1708.04600 : **Anomalous lightcurves of young tilted exorings** by *Mario Sucerquia et al.*

astro-ph/1708.04663 : **Seeds of Life in Space (SOLIS) III. Formamide in protostellar shocks: evidence for gas-phase formation** by *C. Codella, et al.*

astro-ph/1708.04886 : **Rotational Spectral Unmixing of Exoplanets: Degeneracies between Surface Colors and Geography** by *Yuka Fujii, Jacob Lustig-Yaeger, Nicolas B. Cowan*

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