ExoPlanet News
An Electronic Newsletter

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Editors: J. Venturini, L. Mishra, H. Capelo & D. Angerhausen
NCCR PlanetS, Gesellschaftsstrasse 6, CH-3012 Bern, Switzerland

exoplanetnews@nccr-planets.ch http://nccr-planets.ch/exoplanetnews

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1 Editorial

Welcome to Edition 127 of the ExoPlanet News! We are pleased to send you the first ExoPlanet newsletter of the new decade which is also the first of our new team (see below). As usual we bring you abstracts of scientific papers, job ads, conference announcements, and an overview of exoplanet-related articles on astro-ph. Thanks a lot to all of you who contributed to this issue of the newsletter!

We are all very excited that the launch of the CHEOPS satellite went successful on 18. December 2019. On 8. January 2020 the payload powered up and sent CHEOPS' first test images. The next opportunity to cross fingers will be 27. January 2020 when the cover of the space telescope will open.

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 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 18. February 2020. All the best for a decade full of exciting exoplanet science to all of you!

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

Julia Venturini
Lokesh Mishra
Holly Capelo
Daniel Angerhausen (Editor-in-Chief)

2 Abstracts of refereed papers

An ultra-short period rocky super-Earth orbiting the G2-star HD 80653

G. Frustagli[1,2], *E. Poretti* [1,3], *T. Milbourne* [4,5], *L. Malavolta* [6], *A. Mortier* [7], *Vikash Singh* [6], *A. S. Bonomo* [8], *L. A. Buchhave* [9], *L. Zeng* [5,10], *A. Vanderburg* [5], *S. Udry* [11], *G. Andreuzzi*[3,12], *A. Collier-Cameron* [13], *R. Cosentino* [3], *M. Damasso* [8], *A. Ghedina* [3], *A. Harutyunyan* [3], *R. D. Haywood* [5], *D. W. Latham* [5], *M. López-Morales* [5], *V. Lorenzi* [3,14], *A.F. Martinez Fiorenzano* [3], *M. Mayor* [11], *G. Micela* [15], *E. Molinari*[16], *F. Pepe* [11], *D. Phillips* [5], *K. Rice* [17,18], *A. Sozzetti* [8]

[1] INAF - Osservatorio Astronomico di Brera, Via E. Bianchi 46, 23807 Merate, Italy
[2] Dipartimento di Fisica G. Occhialini, Università degli Studi di Milano-Bicocca, Piazza della Scienza 3, 20126 Milano, Italy
[3] Fundación Galileo Galilei-INAF, Rambla José Ana Fernandez Pérez 7, 38712 Breña Baja, TF, Spain
[4] Department of Physics, Harvard University, 17 Oxford Street, Cambridge MA 02138, USA
[5] Center for Astrophysics | Harvard & Smithsonian, 60 Garden Street, Cambridge, MA 01238, USA
[6] INAF - Osservatorio Astrofisico di Catania, Via S. Sofia 78, 95123 Catania, Italy
[7] Astrophysics Group, Cavendish Laboratory, University of Cambridge, J.J. Thomson Avenue, Cambridge CB3 0HE, UK
[8] INAF - Osservatorio Astrofisico di Torino, Via Osservatorio 20, 10025 Pino Torinese, Italy
[9] DTU Space, National Space Institute, Technical University of Denmark, Elektrovej 328, 2800 Kgs. Lyngby, Denmark
[10] Department of Earth and Planetary Sciences, Harvard University, 20 Oxford Street, Cambridge, MA 02138, USA
[11] Observatoire de Genève, Département d'Astronomie de l'Université de Genève, 51 ch. des Maillettes, 1290 Versoix, Switzerland
[12] INAF - Osservatorio Astronomico di Roma, Via Frascati 33, 00040 Monte Porzio Catone, Italy
[13] Centre for Exoplanet Science, SUPA, School of Physics and Astronomy, University of St. Andrews, St. Andrews, KY169SS, UK
[14] Instituto de Astrofísica de Canarias, C/Vía Láctea s/n, 38205 La Laguna, Spain
[15] INAF - Osservatorio Astronomico di Palermo, Piazza del Parlamento 1, 90124 Palermo, Italy
[16] INAF - Osservatorio Astronomico di Cagliari, Via della Scienza 5, 09047 Selargius, Italy
[17] SUPA, Institute for Astronomy, Royal Observatory, University of Edinburgh, Blackford Hill, Edinburgh EH93HJ, UK
[18] Centre for Exoplanetary Science, University of Edinburgh, Edinburgh, UK

Astronomy & Astrophysics, in press (arXiv:2001.02217)

Ultra-short period (USP) planets are a class of exoplanets with periods shorter than one day. The origin of this sub-population of planets is still unclear, with different formation scenarios highly dependent on the composition of the USP planets. A better understanding of this class of exoplanets will, therefore, require an increase in the sample of such planets that have accurate and precise masses and radii, which also includes estimates of the level of irradiation and information about possible companions. Here we report a detailed characterization of a USP planet around the solar-type star HD 80653≡EP 251279430 using the *K2* light curve and 108 precise radial velocities obtained with the HARPS-N spectrograph, installed on the Telescopio Nazionale Galileo. From our radial velocity measurements, we constrained the mass of HD 80653 b to $M_b = 5.60 \pm 0.43\ M_\oplus$. We also detected a clear long-term trend in the radial velocity data. We derived the fundamental stellar parameters and determined a radius of $R_\star = 1.22 \pm 0.01\ R_\odot$ and mass of $M_\star = 1.18 \pm 0.04\ M_\odot$, suggesting that HD 80653, has an age of 2.7 ± 1.2 Gyr. The bulk density ($\rho_b = 7.4 \pm 1.1$ g cm^{-3}) of the planet is consistent with an Earth-like composition of rock and iron with no thick atmosphere. Our analysis of the *K2* photometry also suggests hints of a shallow secondary eclipse with a depth of 8.1±3.7 ppm. Flux variations along the orbital phase are consistent with zero. The most important contribution might come from the day-side thermal emission from the surface of the planet at $T \sim 3480$ K.

Download/Website: `https://arxiv.org/abs/2001.02217`

Contact: `giuseppe.frustagli@inaf.it`

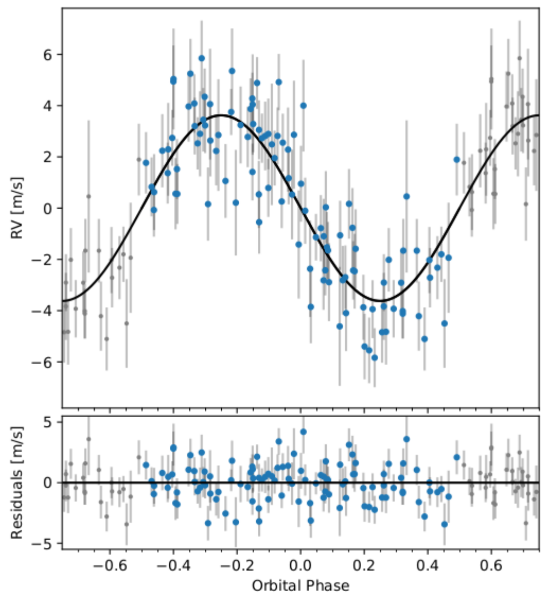

Figure 1: Frustagli *et al.*: *Top panel:* phase-folded RV fit obtained using PyORBIT. Activity jitter and long-term trend both removed. Larger blue dots delimitate the RV variation over a single orbital cycle. *Bottom panel:* residuals from the best fit.

ALMA and NACO observations towards the young exoring transit system J1407 (V1400 Cen)

M.A. Kenworthy[1], *P.D. Klaassen*[2], *M. Min*[3], *N. van der Marel*[4,5], *A.J. Bohn*[1], *M. Kama*[6], *A. Triaud*[7], *A. Hales*[8,9], *J. Monkiewicz*[10], *E. Scott*[11], *E.E. Mamajek*[12,13]

[1] Leiden Observatory, Leiden University, P.O. Box 9513, 2300 RA Leiden, The Netherlands
[2] UK Astronomy Technology Centre, Royal Observatory Edinburgh, Blackford Hill, Edinburgh EH9 3HJ, UK
[3] SRON Netherlands Institute for Space Research, Sorbonnelaan 2, 3584 CA Utrecht, The Netherlands
[4] Herzberg Astronomy & Astrophysics Programs, National Research Council of Canada Herzberg, 5071 West Saanich Rd, Victoria, BC, V9E 2E7, Canada
[5] Department of Physics & Astronomy, University of Victoria, Victoria, BC, V8P 1A1, Canada
[6] Institute of Astronomy, University of Cambridge, Madingley Road, Cambridge, CB3 OHA, UK
[7] School of Physics & Astronomy, University of Birmingham, Edgbaston, Birmingham B15 2TT, UK
[8] National Radio Astronomy Observatory, 520 Edgemont Road, Charlottesville, VA 22903-2475
[9] Atacama Large Millimeter/Submillimeter Array, Joint ALMA Observatory, Alonso de Cordova 3107, Vitacura 763-0355, Santiago
[10] School of Earth and Space Exploration, Arizona State University, Tempe, AZ 85287, USA
[11] Chinese Academy of Sciences, 52 Sanlihe Road, Xicheng District, 100864 Beijing, China
[12] Jet Propulsion Laboratory, California Institute of Technology, M/S 321-100, 4800 Oak Grove Drive, Pasadena, CA 91109, USA
[13] Department of Physics & Astronomy, University of Rochester, Rochester, NY 14627, USA

Astronomy & Astrophysics, in press/arXiv:1912.03314

Our aim was to directly detect the thermal emission of the putative exoring system responsible for the complex deep transits observed in the light curve for the young Sco-Cen star 1SWASP J140747.93-394542.6 (V1400 Cen, hereafter J1407), confirming it as the occulter seen in May 2007, and to determine its orbital parameters with respect to the star. We used the Atacama Large Millimeter/submillimeter Array (ALMA) to observe the field centred on J1407 in the 340 GHz (Band 7) continuum in order to determine the flux and astrometric location of the ring system relative to the star. We used the VLT/NACO camera to observe the J1407 system in March 2019 and to search for the central planetary mass object at thermal infrared wavelengths. We detect no point source at the expected location

of J1407, and derive an upper limit 3σ level of $57.6\ \mu\mathrm{Jy}$. There is a point source detected at an angular separation consistent with the expected location for a free-floating ring system that occulted J1407 in May 2007, with a flux of $89\ \mu\mathrm{Jy}$ consistent with optically thin dust surrounding a massive substellar companion. At 3.8 microns with the NACO camera, we detect the star J1407 but no other additional point sources within 1.3 arcseconds of the star, with a lower bound on the sensitivity of $6M_{Jup}$ at the location of the ALMA source, and down to $4M_{Jup}$ in the sky background limit. The ALMA upper limit at the location of J1407 implies that a hypothesised bound ring system is composed of dust smaller than $1\ \mathrm{mm}$ in size, implying a young ring structure. The detected ALMA source has multiple interpretations, including: (i) it is an unbound substellar object surrounded by warm dust in Sco-Cen with an upper mass limit of $6M_{Jup}$, or (ii) it is a background galaxy.

Download/Website: `https://arxiv.org/abs/1912.03314`

Contact: `kenworthy@strw.leidenuniv.nl`

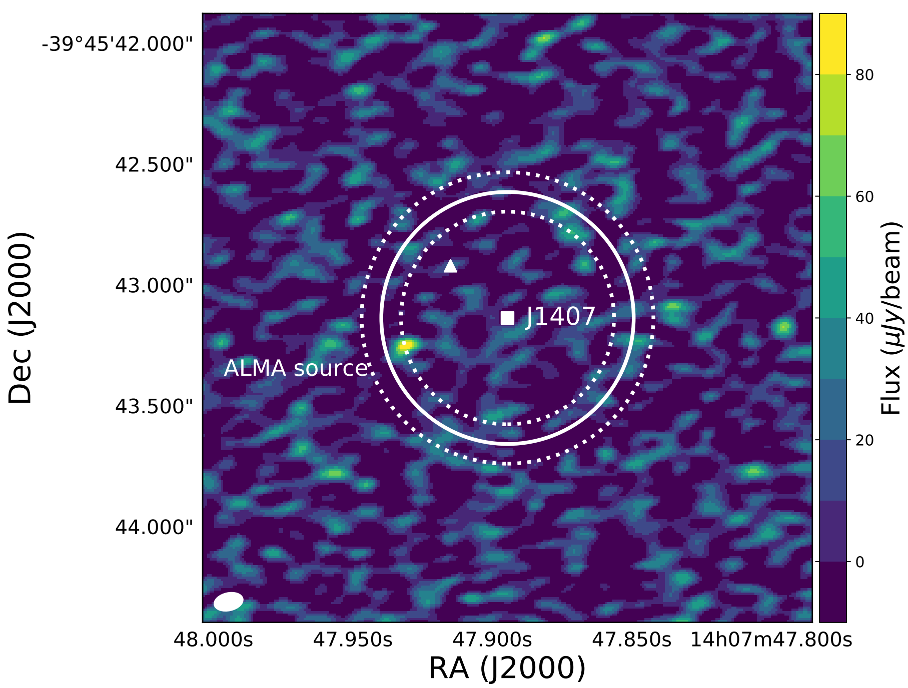

Figure 2: Kenworthy *et al.*: ALMA image of the field towards J1407. The location of the star J1407 in 2017 is shown as a white square, and the white triangle gives the location at the time of the eclipse in 2007. The white ring indicates the expected location for an object travelling at 35 $km\ s^{-1}$ between the two epochs (assuming that the object is co-distant with J1407); the dotted lines represent the 1σ uncertainties. The detected ALMA source is at a position angle of approximately 95 degrees. The ALMA beam is shown in the lower left corner.

Survival of Primordial Planetary Atmospheres: Photodissociation Driven Mass Loss

A. R. Howe[1], *F. C. Adams*[2,3], *M. R. Meyer*[2]
[1] NASA Goddard Space Flight Center, 8800 Greenbelt Rd, Greenbelt, MD 20771, USA
[2] Department of Astronomy, University of Michigan, Ann Arbor, Michigan 48109, USA
[3] Department of Physics, University of Michigan, Ann Arbor, Michigan 48109, USA

The Astrophysical Journal, in press (arXiv:1912.08820)

The most widely-studied mechanism of mass loss from extrasolar planets is photoevaporation via XUV ionization, primarily in the context of highly irradiated planets. However, the lower energy regime of FUV dissociation of hydrogen molecules can also theoretically drive atmospheric evaporation on low-mass planets because the dissociation energy of hydrogen is an order of magnitude greater than the escape energy per proton from the gravity well of an Earth-sized planet. For temperate planets such as the early Earth, impact erosion is expected to dominate in the traditional planetesimal accretion model, but it would be greatly reduced in pebble accretion scenarios, allowing other mass loss processes to be major contributors. We apply the same prescription for photoionization to this photodissociation mechanism and compare it to an analysis of other possible sources of mass loss in pebble accretion scenarios. We find that energy-limited photodissociation could remove the hydrogen atmosphere of an early Earth analog over several Gyr, though not over the shorter period of mass loss in Earth's early history. Impact erosion could remove $\sim$2,300 bars of hydrogen if 1% of the planet's mass is accreted as planetesimals, and these are dominant over all other mass loss processes. Similar results apply to super-Earths and mini-Neptunes, which have only modestly greater escape energies. This mechanism could also preferentially remove hydrogen from a planet's primordial atmosphere, thereby leaving a larger abundance of primordial water compared to standard dry formation models. We discuss the implications of these results for models of rocky planet formation including Earth's formation and the possible application of this analysis to mass loss from observed exoplanets.

Download/Website: `https://arxiv.org/abs/1912.08820`

Contact: `alex.r.howe@nasa.gov`

X-Ray Ionization of Planet-Opened Gaps in Protostellar Disks

S. Y. Kim[1,2,3] *and N. J. Turner*[4]
[1] California Institute of Technology
[2] Ohio State University
[3] University of Surrey, UK
[4] Jet Propulsion Laboratory, California Institute of Technology

ApJ, in press (arXiv:1804.04265)

Young planets with masses approaching Jupiter's have tides strong enough to clear gaps around their orbits in the protostellar disk. Gas flow through the gaps regulates the planets' further growth and governs the disks' evolution. Magnetic forces may drive that flow if the gas is sufficiently ionized to couple to the fields. We compute the ionizing effects of the X-rays from the central young star, using Monte Carlo radiative transfer calculations to find the spectrum of Compton-scattered photons reaching the planet's vicinity. The scattered X-rays ionize the gas at rates similar to or greater than the interstellar cosmic ray rate near planets the mass of Saturn and of Jupiter, located at 5 au and at 10 au, in disks with the interstellar mass fraction of sub-micron dust and with the dust depleted a factor 100. Solving a gas-grain recombination reaction network yields charged particle populations whose ability to carry currents is sufficient to partly couple the magnetic fields to the gas around the planet. Most cases can undergo Hall shear instability, and some can launch magnetocentrifugal winds. However the material on the planet's orbit has diffusivities so large in all the cases we examine, that magneto-rotational turbulence is prevented and the non-ideal terms govern the magnetic field's evolution. Thus the flow of gas in the gaps opened by the young giant planets depends crucially on the finite conductivity.

Download/Website: `https://arxiv.org/abs/1804.04265`

Contact: `neal.turner@jpl.nasa.gov`

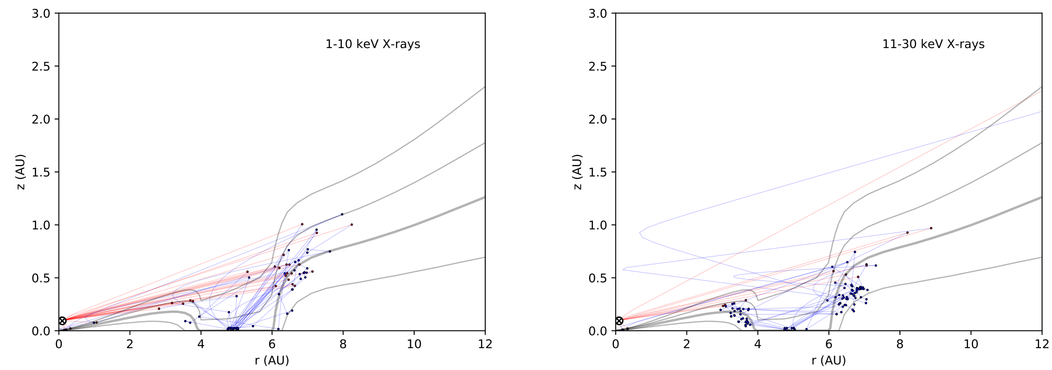

Figure 3: Kim & Turner: Paths in the (r, z) plane of photon packets chosen randomly fromamong those reaching the planet's vicinity in the model with a Jupiter-mass planet at 5 au in a dusty disk. The X-ray source is marked by the cross in a circle near $(0.1, 0.1)$ au. Each path is red before the first scattering, and blue thereafter. Filled circles mark scattering points. The thick grey line shows the surface of unit vertical optical depth to 5-keV photons, while thin grey lines denote optical depths spaced by factors of ten. The first panel shows photons with energies up to 10 keV, for which the single-scattering albedo is below 50%. Most photons reaching the planet are scattered just once off the gap rim. The second panel is for higher-energy, higher-albedo photons, which often scatter repeatedly off the gap walls. Some scatter first in the disk surface layers interior to the gap, and a few pass near the rotation axis as they cross from one side of the disk to the other. The number of packets in each panel is in proportion to the energy band's contribution to ionization near the planet.

Post-main-sequence debris from rotation-induced YORP break-up of small bodies II: multiple fissions, internal strengths and binary production

Dimitri Veras[1,2]

Daniel J. Scheeres[3]

[1] Centre for Exoplanets and Habitability, University of Warwick, Coventry, CV4 7AL, UK
[2] Department of Physics, University of Warwick, Coventry, CV4 7AL, UK
[3] Department of Aerospace Engineering Sciences, The University of Colorado, Boulder, CO 80309, United States

MNRAS, In Press, arXiv:2001.00949

Over one quarter of white dwarfs contain observable metallic debris from the breakup of exo-asteroids. Understanding the physical and orbital history of this debris would enable us to self-consistently link planetary system formation and fate. One major debris reservoir is generated by YORP-induced rotational fission during the giant branch phases of stellar evolution, where the stellar luminosity can exceed the Sun's by four orders of magnitude. Here, we determine the efficacy of the giant branch YORP effect for asteroids with nonzero internal strength, and model post-fission evolution by imposing simple analytic fragmentation prescriptions. We find that even the highest realistic internal strengths cannot prevent the widespread fragmentation of asteroids and the production of a debris field over 100 au in size. We compute the number of successive fission events as they occur in progressively smaller time intervals as the star ascends the giant branches, providing a way to generate size distributions of asteroid fragments. The results are highly insensitive to progenitor stellar mass. We also conclude that the ease with which giant branch YORP breakup can generate binary asteroid subsystems is strongly dependent on internal strength. Formed binary subsystems in turn could be short-lived due to the resulting luminosity-enhanced BYORP effect.

Download/Website: https://arxiv.org/abs/2001.00949

Contact: d.veras@warwick.ac.uk

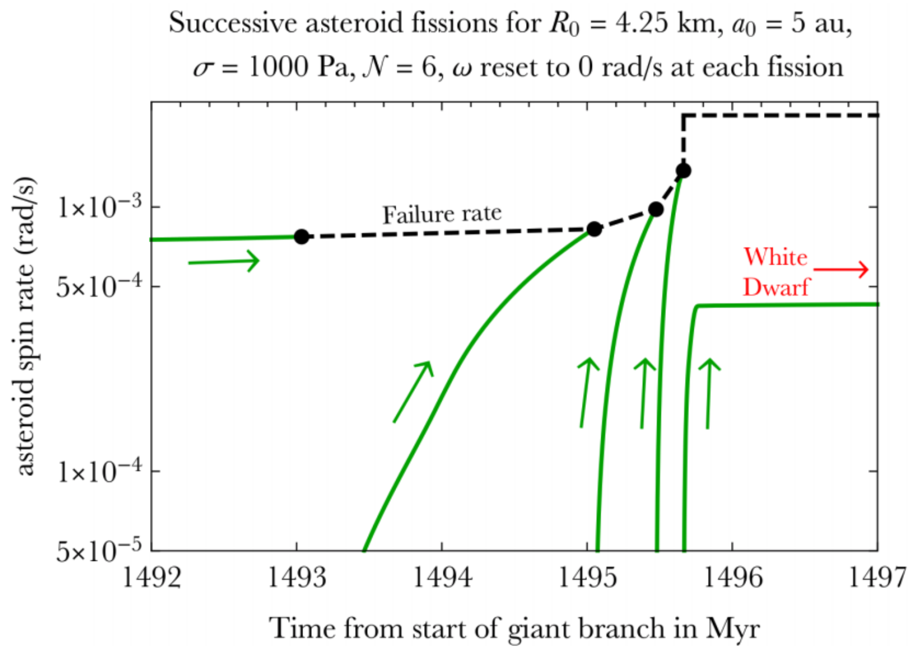

Figure 4: Veras & Scheeres: Spin evolution of an asteroid with a radius of 4.25 km which undergoes four fissions during giant branch evolution. In each fission, the progenitor splits into 6 equal child asteroids, generating a total of about 1300 asteroids of radii 0.39 km. Because the asteroids have internal strength (103 Pa), the failure spin rate increases with each fission. The star becomes a white dwarf soon after the last fission, effectively halting any further spin rate increases.

Temporal Variability in Hot Jupiter Atmospheres

T.D. Komacek[1], *A.P. Showman*[2,3]

[1] Department of the Geophysical Sciences, The University of Chicago, Chicago, IL, 60637, USA
[2] Department of Atmospheric and Oceanic Sciences, School of Physics, Peking University, Beijing, 100871, China
[3] Lunar and Planetary Laboratory and Department of Planetary Sciences, University of Arizona, Tucson, AZ, 85721, USA

The Astrophysical Journal, Published (2020ApJ...888....2K)

Hot Jupiters receive intense incident stellar light on their daysides, which drives vigorous atmospheric circulation that attempts to erase their large dayside-to-nightside flux contrasts. Propagating waves and instabilities in hot Jupiter atmospheres can cause emergent properties of the atmosphere to be time-variable. In this work, we study such weather in hot Jupiter atmospheres using idealized cloud-free general circulation models with double-grey radiative transfer. We find that hot Jupiter atmospheres can be time-variable at the $\sim 0.1 - 1\%$ level in globally averaged temperature and at the $\sim 1 - 10\%$ level in globally averaged wind speeds. As a result, we find that observable quantities are also time variable: the secondary eclipse depth can be variable at the $\leq 2\%$ level, the phase curve amplitude can change by $\leq 1\%$, the phase curve offset can shift by $\leq 5^\circ$, and terminator-averaged wind speeds can vary by $\leq 2\ \mathrm{km\ s^{-1}}$. Additionally, we calculate how the eastern and western limb-averaged wind speeds vary with incident stellar flux and the strength of an imposed drag that parameterizes Lorentz forces in partially ionized atmospheres. We find that the eastern limb is blueshifted in models over a wide range of equilibrium temperature and drag strength, while the western limb is only redshifted if equilibrium temperatures are ≤ 1500 K and drag is weak. Lastly, we show that temporal variability may be observationally detectable in the infrared through secondary eclipse observations with *JWST*, phase curve observations with future space telescopes (e.g., *ARIEL*), and/or Doppler wind speed measurements with high-resolution spectrographs.

Download/Website: `https://arxiv.org/abs/1910.09523`

Contact: `tkomacek@uchicago.edu`

Revisited mass-radius relations for exoplanets below $120 M_\oplus$

J. F. Otegi[1,2], *F. Bouchy*[1], *and R. Helled* [2]

[1] Observatoire Astronomique de l'Université de Genève, 51 Ch. des Maillettes, – Sauverny – 1290 Versoix, Switzerland
[2] Institute for Computational Science, University of Zurich, Winterthurerstr. 190, CH-8057 Zurich, Switzerland

Astronomy & Astrophysics, in press (1911.04745)

The masses and radii of exoplanets are fundamental quantities needed for their characterisation. Studying the different populations of exoplanets is important for understanding the demographics of the different planetary types, which can then be linked to planetary formation and evolution. We present an updated exoplanet catalogue based on reliable, robust, and, as much as possible accurate mass and radius measurements of transiting planets up to 120 $M_\oplus$. The resulting mass-radius (M-R) diagram shows two distinct populations, corresponding to rocky and volatile-rich exoplanets which overlap in both mass and radius. The rocky exoplanet population shows a relatively small density variability and ends at mass of $\sim 25 M_\oplus$, possibly indicating the maximum core mass that can be formed. We use the composition line of pure water to separate the two populations, and infer two new empirical M-R relations based on this data: $M = (0.9 \pm 0.06)\ R^{(3.45 \pm 0.12)}$ for the rocky population, and $M = (1.74 \pm 0.38)\ R^{(1.58 \pm 0.10)}$ for the volatile-rich population. While our results for the two regimes are in agreement with previous studies, the new M-R relations better match the population in the transition region from rocky to volatile-rich exoplanets, which correspond to a mass range of 5-25 $M_\oplus$, and a radius range of 2-3 $R_\oplus$.

Download/Website: `Article at: https://arxiv.org/pdf/1911.04745.pdf. Exoplanet catalog at: https://dace.unige.ch/exoplanets/.`

Contact: `jonfr17@gmail.com`

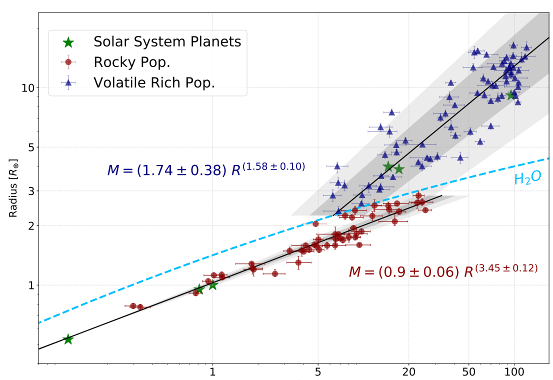

Figure 5: Ortegi *et al.*: Revisited M-R diagram after applying our criteria to keep reliable and robust mass measurements with relative uncertainties smaller than 25% for mass and smaller than 8% for radius. It also shows the M-R relations fitting rocky and volatile-rich populations. Dotted line corresponds the composition line of pure water using QEOS for a temperature of 300K (More1988). The grey and light-grey envelopes represent the $\pm 1\sigma$ and $\pm 2\sigma$ regions of the fit.

MIRACLES: atmospheric characterization of directly imaged planets and substellar companions at 4–5 micron. I. Photometric analysis of β Pic b, HIP 65426 b, PZ Tel B and HD 206893 B

T. Stolker[1], *S. P. Quanz*[1], *K. O. Todorov*[2], *J. Kühn*[3,1], *P. Mollière*[4,5], *M. R. Meyer*[6], *T. Currie*[7,8], *S. Daemgen*[1], *B. Lavie*[9]

[1] Institute for Particle Physics and Astrophysics, ETH Zurich, Wolfgang-Pauli-Strasse 27, 8093 Zurich, Switzerland
[2] Anton Pannekoek Institute for Astronomy, University of Amsterdam, Science Park 904, 1090 GE Amsterdam, The Netherlands
[3] Center for Space and Habitability, University of Bern, Gesellschaftsstrasse 6, 3012, Bern, Switzerland
[4] Leiden Observatory, Leiden University, Postbus 9513, 2300, RA Leiden, The Netherlands
[5] Max-Planck-Institut für Astronomie, Königstuhl 17, 69117 Heidelberg, Germany
[6] Department of Astronomy, University of Michigan, 1085 South University Avenue, Ann Arbor, MI 48109-1107, USA
[7] NASA-Ames Research Center, Moffett Field, CA, USA
[8] Subaru Telescope, National Astronomical Observatory of Japan, 650 North A‘ohōkū Place, Hilo, HI 96720, USA
[9] Observatoire astronomique de l'Université de Genève, 51 chemin des Maillettes, 1290 Versoix, Switzerland

Astronomy & Astrophysics, in press (arXiv:1912.13316)

Directly imaged planets and substellar companions are key targets for the characterization of self-luminous atmospheres. Their photometric appearance at 4–5 μm is sensitive to the chemical composition and cloud content of their atmosphere. We aim at systematically characterizing the atmospheres of directly imaged low-mass companions at 4–5 μm. We want to homogeneously process the data, provide robust flux measurements, and compile a photometric library at thermal wavelengths of these mostly young, low-gravity objects. In this way, we want to find trends related to their spectral type and surface gravity by comparing with isolated brown dwarfs and predictions from atmospheric models. We have used the high-resolution, high-contrast capabilities of NACO at the Very Large Telescope (VLT) to directly image the companions of HIP 65426, PZ Tel, and HD 206893 in the NB4.05 and/or M' filters. For the same targets, and additionally β Pic, we have also analyzed six archival VLT/NACO datasets which were taken with the NB3.74, L', NB4.05, and M' filters. The data processing and photometric extraction of the companions was done with `PynPoint` while the `species` toolkit was used to further analyze and interpret the fluxes and colors. We have detected for the first time HIP 65426 b, PZ Tel B, and HD 206893 B in the NB4.05 filter, PZ Tel B and HD 206893 B in the M' filter, and β Pic b in the NB3.74 filter. We have provided calibrated magnitudes and fluxes with a careful analysis of the error budget, both for the new and archival datasets. The L' – NB4.05 and L' – M' colors of the studied sample are all red while the NB4.05 – M' color is blue for β Pic b, gray for PZ Tel B, and red for HIP 65426 b and HD 206893 B (although typically with low significance). The absolute NB4.05 and M' fluxes of our sample are all larger than those of field dwarfs with similar spectral types. Finally, the surface gravity of β Pic b has been constrained to $\log g = 4.17^{+0.10}_{-0.13}$ dex from its photometry and dynamical mass. A red color at 3–4 μm and a blue color at 4–5 μm might be (partially) caused by H_2O and CO absorption, respectively, which are expected to be the most dominant gaseous opacities in hot ($T_{\rm eff} \gtrsim 1300$ K) atmospheres. The red characteristics of β Pic b, HIP 65426 b, and HD 206893 B at 3–5μm, as well as their higher fluxes in NB4.05 and M' compared to field dwarfs, indicate that cloud densities are enhanced close to the photosphere as a result of their low surface gravity.

Download/Website: `https://arxiv.org/abs/1912.13316`

Contact: `tomas.stolker@phys.ethz.ch`

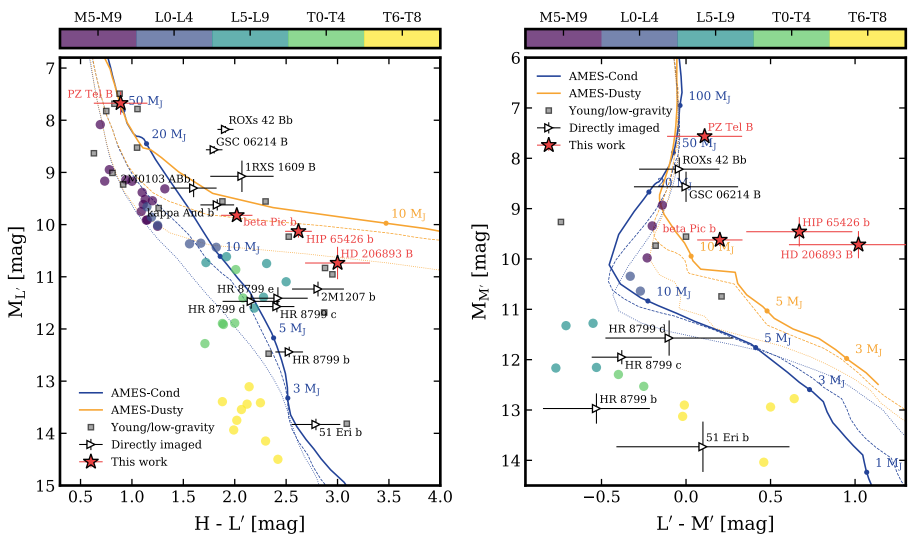

Figure 6: Stolker *et al.*: Color-magnitude diagrams of $H - L'$ vs. $M_{L'}$ (*left panel*) and $L' - M'$ vs. $M_{M'}$ (*right panel*). The field objects are color coded by M, L, and T spectral types (see discrete colorbar), the young and/or low-gravity dwarf objects are indicated with a *gray square*, and the directly imaged companions are labeled individually. The companions from this study are highlighted with a *red star*. The *blue* and *orange* lines show the synthetic colors and magnitudes computed from the AMES-Cond and AMES-Dusty evolutionary tracks for ages of 20 Myr (*solid*), 100 Myr (*dashed*), and 1000 Myr (*dotted*)

3 Jobs and Positions

Postdoctoral Position in Astronomical Instrumentation for Exoplanet Imaging

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

University of Liège, January 2019

The STAR Institute of the University of Liège is inviting applications for a postdoctoral research position in the field of wavefront sensing applied to high-contrast imaging. The successful candidate will contribute to two on-going projects. The first project (SALTO, 2018–2021) aims to develop and operate a laser-guided adaptive optics system in collaboration with an industrial partner. This project will be used as a robotic AO pathfinder for astronomy applications and for optical telecommunications, and as a technology platform for new wavefront control concepts. The second project (NNExI, 2019–2023) aims to develop and demonstrate new focal-plane wavefront sensing techniques for high-contrast imaging, leveraging the power of machine learning. During the first year of the position, the successful applicant will be in charge of integrating and testing the AO module for SALTO. The work will then shift to the development and laboratory demonstration of new focal-plane wavefront sensing techniques, which will require upgrades to our high-contrast imaging testbed. Participation to on-sky test campaigns will also be considered.

A successful candidate must hold a PhD in astronomy, physics, or a related field, and have experience in optical/infrared instrumentation. Applications should include:

- a cover letter,
- a curriculum vitae and a list of publications,
- a statement of current and future research interests (up to 2 pages).

The application, merged into one single pdf file, should be sent by email to Olivier Absil (`olivier.absil@uliege.be`). The applicants should also provide the names and contact details of three referees who could be contacted for reference letters.

Complete applications received by **24 January 2020** will receive full consideration. The preferred starting date of the appointment is April 2020, although we would accept starting dates up to July 2020. The appointment is initially for two years, with renewals for a third and fourth year contingent upon satisfactory progress.

The position comes with full benefits and a competitive salary. Informal enquiries are welcome and should be sent to the address provided above.

Download/Website: `https://jobregister.aas.org/ad/533a1907`

Contact: `olivier.absil@uliege.be`

PhD Position in Protoplanetary Discs and Planet Formation

Sebastiaan Krijt[1]
[1] School of Physics and Astronomy, University of Exeter, UK

University of Exeter, Fall 2020

The University of Exeter is inviting applications for a fully funded PhD studentship to start in the fall of 2020. The Exeter Astrophysics group is one of the leading, and largest, groups in the UK for studying star formation and extra-solar planets.

The theme of this PhD project is simulating the beginnings of planet formation inside gas-rich protoplanetary discs. The student will (further) develop novel numerical techniques to model dust coagulation, the chemical evolution of protoplanetary disc materials, and the creation of planetesimals. The goal will be to predict the chemical compositions of the forming planetesimals and understand how these reflect the physical and chemical conditions in the protoplanetary nebula. Where possible, model predictions will be compared to observational constraints such as ALMA observations of gas and dust in young protoplanetary discs, or results from in-situ measurements of left-over planetesimals in our own solar system (e.g., comets, asteroids). This project will be supervised by Dr. Sebastiaan Krijt, who is joining the University of Exeter in the summer of 2020.

Applicants must have obtained, or be about to obtain, a First or Upper Second Class UK Honours degree, or the equivalent qualifications gained outside the UK, in an appropriate area of science or technology. To apply, follow the instructions described in the link below.

Download/Website: `https://jobregister.aas.org/ad/55a3060c`

Contact: `skrijt@email.arizona.edu`

Two Postdoctoral Positions on the Formation and Dynamics of Extrasolar systems

Prof. Anne-Sophie Libert

naXys, University of Namur, Belgium, April - July 2020

The exoplanet research team of the University of Namur is looking for two postdoctoral researchers for one year, with the possibility of renewal for an additional year, to study 1) the dynamics and stability and 2) the late-stage formation of transit-detected extrasolar systems, respectively. The candidates must have obtained their PhD diploma for less than 6 years, and have an expertise in celestial mechanics, dynamical systems and/or formation of planetary systems, with good skills in theoretical/numerical modeling. Strong interest in extrasolar systems and knowledge of the literature on the field are required. Motivation, autonomy, scientific writing and speaking skills are essential.

The candidates will benefit from their affiliation to the naXys research institute, consisting of a group of more than 60 researchers, with interdisciplinary projects, covering numerical and theoretical approaches in dynamical and complex systems. In particular, SPACE (Dynamical astronomy, cosmology and astrobiology) is one of the five high-level research directions of naXys.

The position should be filled at the earliest possible date, but no later than 1st July 2020. Salary conditions are attractive, and a personal budget is available to support conference participations. Applications consisting of a CV, a publication list, a statement of interest (max. 2 pages, including a description of research interests, past achievements and future research plans), the copies of university diplomas, and the contact details of three reference names, should be sent to Prof. Anne-Sophie Libert (in a single pdf file) by February 15th 2020.

Contact: `anne-sophie.libert@unamur.be`

4 Conferences

XVIth Rencontres du Vietnam. Planetary Science: The Young Solar System

Conference Chair(s): Ramon Brasser and Tobias C. Hinse

Quy Nhon, Vietnam, 06. - 12. September 2020

The Solar System is known to have formed 4.5 billion years ago. In this conference we discuss the early evolution of the Solar System, mostly within the first billion years. The conference consists of the following topical sessions:

- Protoplanetary & Debris Discs
- Planet formation: Data vs Models
- Hadean Earth and Pre-Noachian Mars
- Late accretion, Impact Bombardment and Small Bodies
- Planetary Interior Evolution and Volcanism
- Atmospheric Composition and Evolution
- Giant Planets and their Satellites
- Active Young Sun
- What can Extrasolar Planets teach us about the Solar System?

Scientific Organizing Committee

- Ramon Brasser (Earth Life Science Institute, Japan), chair
- Tobias C. Hinse (Chungnam National University, South Korea), chair
- Elizabeth Bell (University of California Los Angeles, USA)
- Bertram Bitsch (Max Planck Institute for Astronomy, Germany)
- Vera Assis Fernandes (University of Manchester, UK & Museum für Naturkunde Berlin, Germany)
- Gabriella Gilli (Instituto de Astrofísica e Ciências do Espaço, Portugal)
- Guillaume Hébrard (Institute d'Astrophysique de Paris, France)

- Ming-Chang Liu (University of California Los Angeles, USA)
- Yamila Miguel (Leiden Observatory, Netherlands)
- Stephen J. Mojzsis (University of Colorado Boulder, USA)
- Stephanie Werner (Centre for Earth Evolution and Dynamics, Norway)
- Fumi Yoshida (Chiba Institute of Technology, Japan)

Download/Website: https://www.icisequynhon.com/conferences/2020/planetary_science/

Contact: Aimie Fong, Administration, rencontres.vietnam@gmail.com

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 now open. Registration costs £100 until 15 February 2020, when the registration will rise to £120. We have 150 rooms at hotels on the Birmingham campus at preferential rates until 22 February. To limit carbon emission, please consider train travel to reach Birmingham.

Download/Website: www.ukexom2020.uk
Contact: ukexom2020@contacts.bham.ac.uk

5 As seen on astro-ph

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

December 2019

astro-ph/1912.00255: **Do Metal-Rich Stars Make Metal-Rich Planets? New Insights on Giant Planet Formation from Host Star Abundances** by *Johanna K. Teske et al.*

astro-ph/1912.00291: **A sub-Neptune sized planet transiting the M2.5-dwarf G 9-40: Validation with the Habitable-zone Planet Finder** by *Gudmundur Stefansson et al.*

astro-ph/1912.00371: **Enhancement of impact heating in pressure-strengthened rocks in oblique impacts** by *Shigeru Wakita et al.*

astro-ph/1912.00482: **The NANOGrav 11-year Data Set: Constraints on Planetary Masses Around 45 Millisecond Pulsars** by *E. A. Behrens et al.*

astro-ph/1912.00918: **Colour and Tropospheric Cloud Structure of Jupiter from MUSE/VLT: Retrieving a Universal Chromophore** by *Ashwin S. Braude et al.*

astro-ph/1912.01017: **KELT-25b and KELT-26b: A Hot Jupiter and a Substellar Companion Transiting Young A-stars Observed by TESS** by *Romy Rodríguez Martínez et al.*

astro-ph/1912.01232: `PlanetEvidence`**: Planet or Noise?** by *Jacob Golomb et al.*

astro-ph/1912.01240: **Lunar impact craters identification and age estimation with Chang'E data by deep and transfer learning** by *Chen Yang et al.*

astro-ph/1912.01360: **An apparently eccentric orbit of the exoplanet WASP-12 b as a radial velocity signature of planetary-induced tides in the host star** by *Gracjan Maciejewski et al.*

astro-ph/1912.01610: **Are Inner Disc Misalignments Common? ALMA Reveals an Isotropic Outer Disc Inclination Distribution for Young Dipper Stars** by *M. Ansdell et al.*

astro-ph/1912.01611: **Accretion of a giant planet onto a white dwarf** by *Boris T. Gaensicke et al.*

astro-ph/1912.01637: **Collisional disruption of highly porous targets in the strength regime: Effects of mixture** by *Yuichi Murakami et al.*

astro-ph/1912.01821: **Cool Jupiters greatly outnumber their toasty siblings: Occurrence rates from the Anglo-Australian Planet Search** by *Robert A. Wittenmyer et al.*

astro-ph/1912.01894: **Identification of a Minimoon Fireball** by *P. M. Shober et al.*

astro-ph/1912.01895: **Where Did They Come From, Where Did They Go. Grazing Fireballs** by *P.M. Shober et al.*

astro-ph/1912.01925: **NaCo polarimetric observations of Sz 91 transitional disk: a remarkable case of dust filtering** by *Karina Maucó et al.*

astro-ph/1912.02137: **Saturn's Probable Interior: An Exploration of Saturn's Potential Interior Density Structures** by *Naor Movshovitz et al.*

astro-ph/1912.02194: **Detailed Characterization of Low Activity Comet 49P/Arend-Rigaux** by *Laurie E. U. Chu et al.*

astro-ph/1912.02268: **Signatures of Clouds in Hot Jupiter Atmospheres: Modeled High Resolution Emission Spectra from 3D General Circulation Models** by *Caleb K. Harada et al.*

astro-ph/1912.02533: **Photometry of an unusual small distant object 2016 ND21** by *Tetiana Hromakina et al.*

astro-ph/1912.02565: **A dusty benchmark brown dwarf near the ice line of HD 72946** by *A.-L. Maire et al.*

astro-ph/1912.02701: **Superabundance of Exoplanet Sub-Neptunes Explained by Fugacity Crisis** by *Edwin S. Kite et al.*

astro-ph/1912.02741: **A HARPS RV search for planets around young nearby stars** by *A. Grandjean et al.*

astro-ph/1912.02787: **Wind of Change: retrieving exoplanet atmospheric winds from high-resolution spectroscopy** by *J. V. Seidel et al.*

astro-ph/1912.02812: **Cloud Atlas: Weak color modulations due to rotation in the planetary-mass companion GU Psc b and 11 other brown dwarfs** by *Ben W.P. Lew et al.*

astro-ph/1912.02821: **XO-7 b: A transiting hot Jupiter with a massive companion on a wide orbit** by *Nicolas Crouzet et al.*

astro-ph/1912.02833: **A record of the final phase of giant planet migration fossilized in the asteroid belt's orbital structure** by *Matthew S. Clement et al.*

astro-ph/1912.03314: **ALMA and NACO observations towards the young exoring transit system J1407 (V1400 Cen)** by *M. A. Kenworthy et al.*

astro-ph/1912.03778: **Star-planet interaction through spectral lines** by *C. Villarreal D'Angelo et al.*

astro-ph/1912.03794: **The Young Planet DS Tuc Ab has a Low Obliquity** by *Benjamin T. Montet et al.*

astro-ph/1912.03822: **KMT-2019-BLG-0842Lb: A Cold Planet Below the Uranus/Sun Mass Ratio** by *Youn Kil Jung et al.*

astro-ph/1912.04095: **A well aligned orbit for the 45 Myr old transiting Neptune DS Tuc Ab** by *G. Zhou et al.*

astro-ph/1912.04150: **USco1621 B and USco1556 B: Two wide companions at the deuterium-burning mass limit in Upper Scorpius** by *Patricia Chinchilla et al.*

astro-ph/1912.04284: **The Young Suns Exoplanet Survey: Detection of a wide orbit planetary mass companion to a solar-type Sco-Cen member** by *A. J. Bohn et al.*

astro-ph/1912.04287: **Constraining Orbital Periods from Nonconsecutive Observations: Period Estimates for Long-Period Planets in Six Systems Observed by K2 During Multiple Campaigns** by *S. Dholakia et al.*

astro-ph/1912.04355: **Debris Disks in Multi-Planet Systems: Are Our Inferences Compromised by Unseen Planets?** by *Jiayin Dong et al.*

astro-ph/1912.04651: **Peering into the formation history of beta Pictoris b with VLTI/GRAVITY long baseline interferometry** by *GRAVITY Collaboration et al.*

astro-ph/1912.04904: **Mass-Metallicity Trends in Transiting Exoplanets from Atmospheric Abundances of H2O, Na, and K** by *Luis Welbanks et al.*

astro-ph/1912.04911: **The widest H survey of accreting protoplanets around nearby transition disks** by *A. Zurlo et al.*

astro-ph/1912.05192: **Measuring precise radial velocities on individual spectral lines : II. Dependance of stellar activity signal on line depth** by *M. Cretignier et al.*

astro-ph/1912.05318: **Searching for water ice in the coma of interstellar object 2I/Borisov** by *Bin Yang et al.*

astro-ph/1912.05392: **Climate bistability of Earth-like exoplanets** by *Murante G. et al.*

astro-ph/1912.05552: **The young planetary system K2-25: constraints on companions and starspots** by *Isabel J. Kain et al.*

astro-ph/1912.05556: **GJ 1252 b: A 1.2 R planet transiting an M-dwarf at 20.4 pc** by *Avi Shporer et al.*

astro-ph/1912.05623: **Effects of photoevaporation on protoplanetary disc 'isochrones'** by *Alice Somigliana et al.*

astro-ph/1912.05884: **Hot Super-Earths with Hydrogen Atmospheres: A Model Explaining Their Paradoxical Existence** by *Darius Modirrousta-Galian et al.*

astro-ph/1912.05889: **HST/STIS capability for Love number measurement of WASP-121b** by *Hugo Hellard et al.*

astro-ph/1912.06773: **TESS Phase Curve of the Hot Jupiter WASP-19b** by *Ian Wong et al.*

astro-ph/1912.06913: **Is pi Men c's atmosphere hydrogen-dominated? Insights from a non-detecton of Hy Ly-alpha absorption** by *Antonio García Muñoz et al.*

astro-ph/1912.07246: **A new chemical scheme for giant planet thermochemistry. Update of the methanol chemistry and new reduced chemical scheme** by *Olivia Venot et al.*

astro-ph/1912.07313: **Type II migration strikes back – An old paradigm for planet migration in discs** by *Chiara E. Scardoni et al.*

astro-ph/1912.08049: **Can close-in giant exoplanets preserve detectable moons?** by *Mario Sucerquia et al.*

astro-ph/1912.08235: **Dim Prospects for Transmission Spectra of Ocean Earths Around M Stars** by *Gabrielle Suissa et al.*

astro-ph/1912.08617: **The Phenomenon of Shape Evolution due to Solar Driven Outgassing for Analogues of Small Kuiper Belt Objects** by *Yuhui Zhao et al.*

astro-ph/1912.08743: **Ozone chemistry on tidally locked M dwarf planets** by *Jack S. Yates et al.*

astro-ph/1912.08781: **Clouds will likely prevent the detection of water vapor in JWST transmission spectra of terrestrial exoplanets** by *Thaddeus D. Komacek et al.*

astro-ph/1912.08838: **Parker Solar Probe Observations of a Dust Trail in the Orbit of (3200) Phaethon** by *Karl Battams et al.*

astro-ph/1912.08994: **Crater-ray formation through mutual collisions of hypervelocity-impact induced ejecta particles** by *Toshihiko Kadono et al.*

astro-ph/1912.09613: **OGLE-2013-BLG-0911Lb: A Secondary on the Brown-Dwarf Planet Boundary around an M-dwarf** by *Shota Miyazaki et al.*

astro-ph/1912.09706: **SVEEEETIES: Singular vector expansion to estimate Earth-like exoplanet temperatures from infrared emission spectra** by *Franz Schreier et al.*

astro-ph/1912.09732: **Can chondrules be produced by the interaction of Jupiter with the protosolar disk?** by *Jean-David Bodénan et al.*

astro-ph/1912.10012: **Validating Scattering-Induced (Sub)millimeter Disk Polarization through the Spectral Index, Wavelength-Dependent Polarization Pattern, and Polarization Spectrum: The Case of HD 163296** by *Zhe-Yu Daniel Lin et al.*

astro-ph/1912.10186: **TOI 564 b and TOI 905 b: Grazing and Fully Transiting Hot Jupiters Discovered by TESS** by *Allen B. Davis et al.*

astro-ph/1912.10213: **A search for the origin of the interstellar comet 2I/Borisov** by *Coryn A.L. Bailer-Jones et al.*

astro-ph/1912.10278: **Gemini-GRACES high-quality spectra of Kepler evolved stars with transiting planets I. Detailed characterization of multi-planet systems Kepler-278 and Kepler-391** by *E. Jofré et al.*

astro-ph/1912.10792: **A compact multi-planet system around a bright nearby star from the Dispersed Matter Planet Project** by *D. Staab et al.*

astro-ph/1912.10793: **An ablating super-Earth in an eccentric binary from the Dispersed Matter Planet Project** by *John R. Barnes et al.*

astro-ph/1912.10874: **Dispersed Matter Planet Project Discoveries of Ablating Planets Orbiting Nearby Bright Stars** by *Carole A. Haswell et al.*

astro-ph/1912.10879: **Dynamical evidence for an early giant planet instability** by *Rafael Ribeiro de Sousa et al.*

astro-ph/1912.10939: **The Detectability and Constraints of Biosignature Gases in the Near & Mid-Infrared from Transit Transmission Spectroscopy** by *Luke Tremblay et al.*

astro-ph/1912.11019: **Orbital Stability of Circumstellar Planets in Binary Systems** by *Billy Quarles et al.*

astro-ph/1912.11178: **Ring Morphology with Dust Coagulation in Protoplanetary Disks** by *JT Laune et al.*

astro-ph/1912.11329: **Simulations of Water Vapor and Clouds on Rapidly Rotating and Tidally Locked Planets: a 3D Model Intercomparison** by *Jun Yang et al.*

astro-ph/1912.11406: **Formation of satellites in circumplanetary discs generated by disc instability** by *C. Inderbitzi et al.*

astro-ph/1912.11883: **Mass constraints for 15 protoplanetary disks from HD 1-0** by *M. Kama et al.*

astro-ph/1912.12305: **Current Population Statistics Do Not Favor Photoevaporation over Core-Powered Mass Loss as the Dominant Cause of the Exoplanet Radius Gap** by *R. O. P. Loyd et al.*

astro-ph/1912.13316: **MIRACLES: atmospheric characterization of directly imaged planets and substellar companions at 4-5 micron. I. Photometric analysis of Pic b, HIP 65426 b, PZ Tel B and HD 206893 B** by *Tomas Stolker et al.*

astro-ph/1912.01900: **A network of precision gravimeters as a detector of matter with feeble nongravitational coupling** by *Wenxiang Hu et al.*

astro-ph/1912.01911: **Global Site Selection for Astronomy** by *N. Aksaker et al.*

astro-ph/1912.02345: **Cold giant planets evaporated by hot white dwarfs** by *Matthias R. Schreiber et al.*

astro-ph/1912.02806: **Spectral library of age-benchmark low-mass stars and brown dwarfs** by *E. Manjavacas et al.*

astro-ph/1912.03736: **The circumstellar environment of 55 Cnc: The super-Earth 55 Cnc e as a primary target for star-planet interactions** by *C. P. Folsom et al.*

astro-ph/1912.04043: **TESS light curves of low-mass detached eclipsing binaries** by *Krzysztof G. Hełminiak et al.*

astro-ph/1912.05343: **Spectroscopic characterization of nine binary star systems as well as HIP107136 and HIP107533** by *T. Heyne et al.*

astro-ph/1912.05834: **The imperative to reduce carbon emissions in astronomy** by *Adam R. H. Stevens et al.*

astro-ph/1912.06213: **Origins Space Telescope Mission Concept Study Report** by *M. Meixner et al.*

astro-ph/1912.06867: **Could star-planet magnetic interactions lead to planet migration and influence stellar rotation ?** by *Jérémy Ahuir et al.*

astro-ph/1912.07659: **Gaia's revolution in stellar variability** by *L. Eyer et al.*

astro-ph/1912.07692: **Improved infrared photometry and a preliminary parallax measurement for the extremely cold brown dwarf CWISEP J144606.62231717.8** by *Federico Marocco*

astro-ph/1912.07759: **TauREx III: A fast, dynamic and extendable framework for retrievals** by *Ahmed F. Al-Refaie et al.*

astro-ph/1912.08572: **Evolution of a Viscous Protoplanetary Disk with Convectively Unstable Regions** by *Ya. N. Pavlyuchenkov et al.*

astro-ph/1912.09136: **Correction of the VIR-Visible data set from the Dawn mission** by *B. Rousseau et al.*

astro-ph/1912.09269: **Machine Learning Regression of extinction in the second Gaia Data Release** by *Yu Bai et al.*

astro-ph/1912.09839: **High-resolution gas phase spectroscopy of molecules desorbed from an ice surface: a proof-of-principle study** by *Patrice Theulé et al.*

astro-ph/1912.10993: **Hot Subdwarf All Southern Sky Fast Transit Survey with the Evryscope** by *Jeffrey K. Ratzloff et al.*

astro-ph/1912.11301: **High-Resolution Near-Infrared Polarimetry and Sub-Millimeter Imaging of FS Tau A: Possible Streamers in Misaligned Circumbinary Disk System** by *Yi Yang et al.*

astro-ph/1912.11572: **Superflares on solar-type stars from the first year observation of TESS** by *Zuo-Lin Tu et al.*

astro-ph/1912.11820: **Effects of 1501000 eV Electron Impacts on Pure Carbon Monoxide Ices using the Interstellar Energetic-Process System (IEPS)** by *C.-H. Huang et al.*

astro-ph/1912.00114: **The computation of seismic normal modes with rotation as a quadratic eigenvalue problem** by *Jia Shi et al.*

astro-ph/1912.02131: **Linearly forced fluid flow on a rotating sphere** by *Rohit Supekar et al.*

astro-ph/1912.02271: **Global-scale Observations and Modeling of Far-Ultraviolet Airglow During Twilight** by *Stanley C. Solomon1 et al.*