ExoPlanet News
An Electronic Newsletter

No. 132, 16 June 2020

Editors: L. Mishra, J. Venturini, H. Capelo & D. Angerhausen
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Contents

1 Editorial

Dear readers,

Welcome to Edition 132 of the ExoPlanet News!

In this edition, we bring you abstracts of scientific papers, job ads, conference announcements, and an overview of exoplanet-related articles on astro-ph. We thank all of you who contributed to this issue of the newsletter.

As before, we are looking forward to your abstracts, ads or announcements for the next issue. This is a community newsletter and, as such, we are eager to receive feedback and suggestions from you, the community. The Latex template for submitting contributions, as well as all previous editions of ExoPlanet News, can be found on the ExoPlanet News webpage (http://nccr-planets.ch/exoplanetnews/).

The next issue will appear 14 July 2020.

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

Lokesh Mishra
Julia Venturini
Holly Capelo
Daniel Angerhausen
Timm-Emanuel Riesen

2 Abstracts of refereed papers

Pebbles versus planetesimals: the outcomes of population synthesis models

N. Brügger[1], R. Burn[1], G.A.L. Coleman[2], Y. Alibert[1], W. Benz[1]
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Astronomy & Astrophysics, in press (arXiv:2006.04121)

In the core accretion scenario of giant planet formation, a massive core forms first and then accretes a gaseous envelope. When discussing how this core forms some divergences appear. First scenarios of planet formation predict the accretion of km-sized bodies, called planetesimals, while more recent works suggest growth by accretion of pebbles, which are cm-sized objects. These two accretion models are often discussed separately and we aim here at comparing the outcomes of the two models with identical initial conditions. The comparison is done using two distinct codes: one computing the planetesimal accretion, the other one the pebble accretion. All the other components of the simulated planet growth are computed identically in the two models: the disc, the accretion of gas and the migration. Using a population synthesis approach, we compare planet simulations and study the impact of the two solid accretion models, focussing on the formation of single planets. We find that the outcomes of the populations are strongly influenced by the accretion model. The planetesimal model predicts the formation of more giant planets, while the pebble accretion model forms more super-Earth mass planets. This is due to the pebble isolation mass ($\mathrm{M_{iso}}$) concept, which prevents planets formed by pebble accretion to accrete gas efficiently before reaching $\mathrm{M_{iso}}$. This translates into a population of planets that are not heavy enough to accrete a consequent envelope but that are in a mass range where type I migration is very efficient. We also find higher gas mass fractions for a given core mass for the pebble model compared to the planetesimal one caused by luminosity differences. This also implies planets with lower densities which could be confirmed observationally. We conclude that the two models produce different outputs. Focusing on giant planets, the sensitivity of their formation differs: for the pebble accretion model, the time at which the embryos are formed, as well as the period over which solids are accreted strongly impact the results, while the population of giant planets formed by planetesimal accretion depends on the planetesimal size and on the splitting in the amount of solids available to form planetesimals.

Download/Website: `http://arxiv.org/abs/2006.04121`

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Planet formation by pebble accretion in ringed disks

A. Morbidelli
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Astronomy & Astrophysics, Volume 638, id.A1, 7 pp. (10.1051/0004-6361/202037983)

Context: Pebble accretion is expected to be the dominant process for the formation of massive solid planets, such as the cores of giant planets and super-Earths. So, far, this process has been studied under the assumption that dust coagulates and drifts throughout the full protoplanetary disk. However, observations show that many disks are structured in rings that may be due to pressure maxima, preventing the global radial drift of the dust.
Aims: We study how the pebble-accretion paradigm changes if the dust is confined in a ring.
Methods: Our approach is mostly analytic. We derive a formula that provides an upper bound to the growth of a planet as a function of time. We also implement numerically the analytic formulæ to compute the growth of a planet located in a typical ring observed in the DSHARP survey, as well as in a putative ring rescaled at 5 AU.
Results: Planet Type-I migration is stopped in a ring, but not necessarily at its center. If the entropy-driven corotation torque is desaturated, the planet is located in a region with a low density of dust, which severely limits its accretion rate. If instead the planet is near the ring's center, its accretion rate can be similar to the one it would have in a classic (ring-less) disk of equivalent dust density. However, the growth rate of the planet is limited by the diffusion of dust in the ring and the final planet's mass is bounded by the total ring's mass. The DSHARP rings are too far from the star to allow the formation of massive planets within the disk's lifetime. However, a similar ring rescaled to 5 AU could lead to the formation of a planet incorporating the full ring's mass in less than 1/2 My.
Conclusions: The existence of rings may not be an obstacle to planet formation by pebble-accretion. However, for accretion to be effective the resting position of the planet has to be relatively near the ring's center and the ring needs to be not too far from the central star. The formation of planets in rings can explain the existence of giant planets with core masses smaller than the so-called pebble isolation mass.

Download/Website: `arXiv:2004.04942`

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Atmosphere loss in planet-planet collisions

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Monthly Notices of the Royal Astronomical Society, in press (arXiv:2006.01881)

Many of the planets discovered by the Kepler satellite are close orbiting Super-Earths or Mini-Neptunes. Such objects exhibit a wide spread of densities for similar masses. One possible explanation for this density spread is giant collisions stripping planets of their atmospheres. In this paper we present the results from a series of smoothed particle hydrodynamics (SPH) simulations of head-on collisions of planets with significant atmospheres and bare projectiles without atmospheres. Collisions between planets can have sufficient energy to remove substantial fractions of the mass from the target planet. We find the fraction of mass lost splits into two regimes – at low impact energies only the outer layers are ejected corresponding to atmosphere dominated loss, at higher energies material deeper in the potential is excavated resulting in significant core and mantle loss. Mass removal is less efficient in the atmosphere loss dominated regime compared to the core and mantle loss regime, due to the higher compressibility of atmosphere relative to core and mantle. We find roughly twenty per cent atmosphere remains at the transition between the two regimes. We find that the specific energy of this transition scales linearly with the ratio of projectile to target mass for all projectile-target mass ratios measured. The fraction of atmosphere lost is well approximated by a quadratic in terms of the ratio of specific energy and transition energy. We provide algorithms for the incorporation of our scaling law into future numerical studies.

Download/Website: `https://arxiv.org/abs/2006.01881`

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Planetary mass-radius relations across the galaxy

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Astronomy & Astrophysics, in press (arXiv:2006.03601)

Planet formation theory suggests that planet bulk compositions are likely to reflect the chemical abundance ratios of their host star's photosphere. Variations in the abundance of particular chemical species in stellar photospheres between different galactic stellar populations demonstrate that there are differences among the expected solid planet bulk compositions. We aim to present planetary mass-radius relations of solid planets for kinematically differentiated stellar populations, namely, the thin disc, thick disc, and halo. Using two separate internal structure models, we generated synthetic planets using bulk composition inputs derived from stellar abundances. We explored two scenarios, specifically iron-silicate planets at 0.1 AU and silicate-iron-water planets at 4 AU. We show that there is a persistent statistical difference in the expected mass-radius relations of solid planets among the different galactic stellar populations. At 0.1 AU for silicate-iron planets, there is a 1.51 to 2.04% mean planetary radius difference between the thick and thin disc stellar populations, whilst for silicate-iron-water planets past the ice line at 4 AU, we calculate a 2.93 to 3.26% difference depending on the models. Between the halo and thick disc, we retrieve at 0.1 AU a 0.53 to 0.69% mean planetary radius difference, and at 4 AU we find a 1.24 to 1.49% difference depending on the model. Future telescopes (such as PLATO) will be able to precisely characterize solid exoplanets and demonstrate the possible existence of planetary mass-radius relationship variability between galactic stellar populations.

Download/Website: `https://arxiv.org/abs/2006.03601`

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The lifetimes of planetary debris discs around white dwarfs

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MNRAS, In Press, arXiv:2006.03073

The lifetime of a planetary disc which orbits a white dwarf represents a crucial input parameter into evolutionary models of that system. Here we apply a purely analytical formalism to estimate lifetimes of the debris phase of these discs, before they are ground down into dust or are subject to sublimation from the white dwarf. We compute maximum lifetimes for three different types of white dwarf discs, formed from (i) radiative YORP breakup of exo-asteroids along the giant branch phases at 2-100 au, (ii) radiation-less spin-up disruption of these minor planets at $\sim 1.5 - 4.5 R_{\odot}$, and (iii) tidal disruption of minor or major planets within about $1.3 R_{\odot}$. We display these maximum lifetimes as a function of disc mass and extent, constituent planetesimal properties, and representative orbital excitations of eccentricity and inclination. We find that YORP discs with masses up to 10^{24} kg live long enough to provide a reservoir of surviving cm-sized pebbles and m- to km-sized boulders that can be perturbed intact to white dwarfs with cooling ages of up to 10 Gyr. Debris discs formed from the spin or tidal disruption of these minor planets or major planets can survive in a steady state for up to respectively 1 Myr or 0.01 Myr, although most tidal discs would leave a steady state within about 1 yr. Our results illustrate that dust-less planetesimal transit detections are plausible, and would provide particularly robust evolutionary constraints. Our formalism can easily be adapted to individual systems and future discoveries.

Download/Website: `https://arxiv.org/abs/2006.03073`

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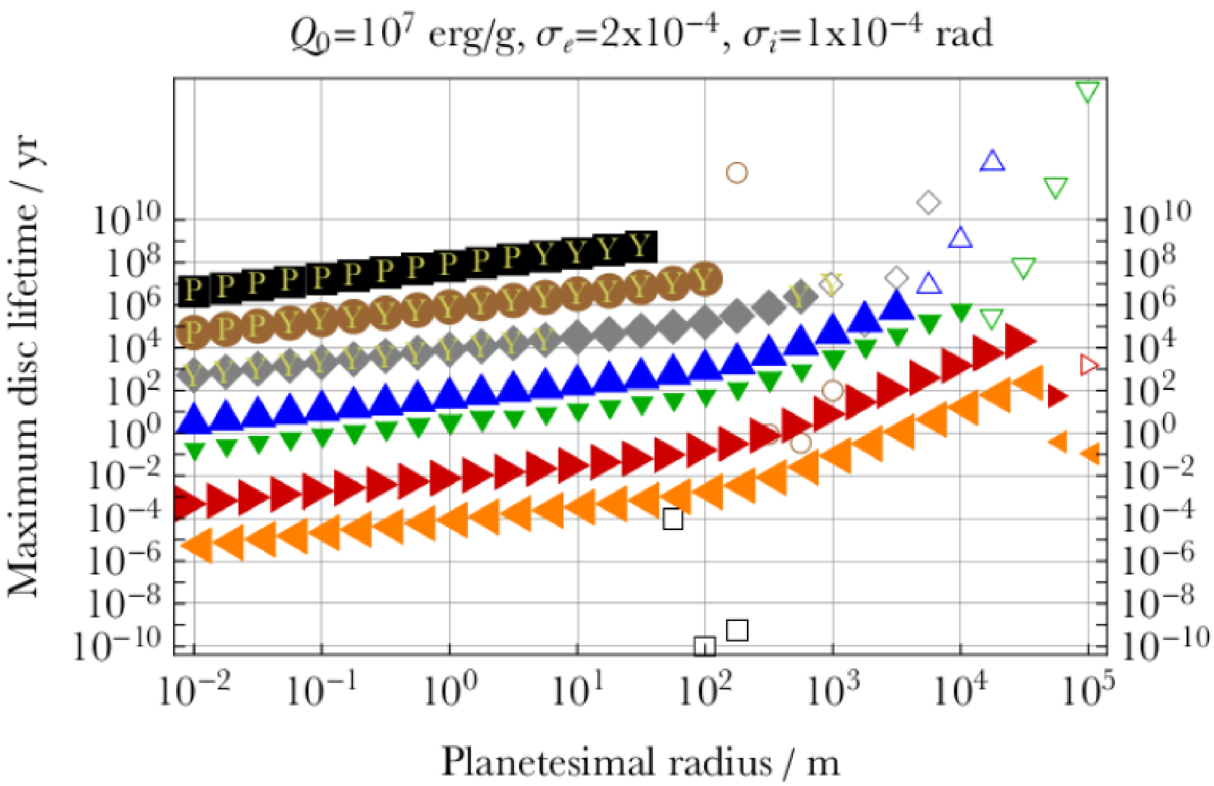

Figure 1: Maximum debris disc lifetimes of tidal discs (formed from destruction of bodies which travel into the white dwarf's tidal disruption distance), for disc masses of 10^{12} kg (squares), 10^{14} kg (circles), 10^{16} kg (diamonds), 10^{18} kg (up-triangles), 10^{20} kg (down-triangles), 10^{22} kg (right-triangles) and 10^{24} kg (left-triangles).

Super-Rayleigh Slopes in Transmission Spectra of Exoplanets Generated by Photochemical Haze

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The Astrophysical Journal Letter, published (2020ApJ...895L..47O)

Spectral slopes in optical transmission spectra of exoplanetary atmospheres encapsulate information on the properties of exotic clouds. The slope is usually attributed to the Rayleigh scattering caused by tiny aerosol particles, whereas recent retrieval studies have suggested that the slopes are often steeper than the canonical Rayleigh slopes. Here, we propose that photochemical haze formed in vigorously mixing atmospheres can explain such super-Rayleigh slopes. We first analytically show that the spectral slope can be steepened by the vertical opacity gradient in which atmospheric opacity increases with altitude. Using a microphysical model, we demonstrate that such opacity gradient can be naturally generated by photochemical haze, especially when the eddy mixing is substantially efficient. The transmission spectra of hazy atmospheres can be demarcated into four typical regimes in terms of the haze mass flux and eddy diffusion coefficient. We find that the transmission spectrum can have the spectral slope 2–4 times steeper than the Rayleigh slope if the eddy diffusion coefficient is sufficiently high and the haze mass flux falls into a moderate value. Based on the eddy diffusion coefficient suggested by a recent study of atmospheric circulations, we suggest that photochemical haze preferentially generates super-Rayleigh slopes at planets with equilibrium temperature of 1000–1500 K, which might be consistent with results of recent retrieval studies. Our results would help to interpret the observations of spectral slopes from the perspective of haze formation.

Download/Website: `https://arxiv.org/abs/2005.08880`

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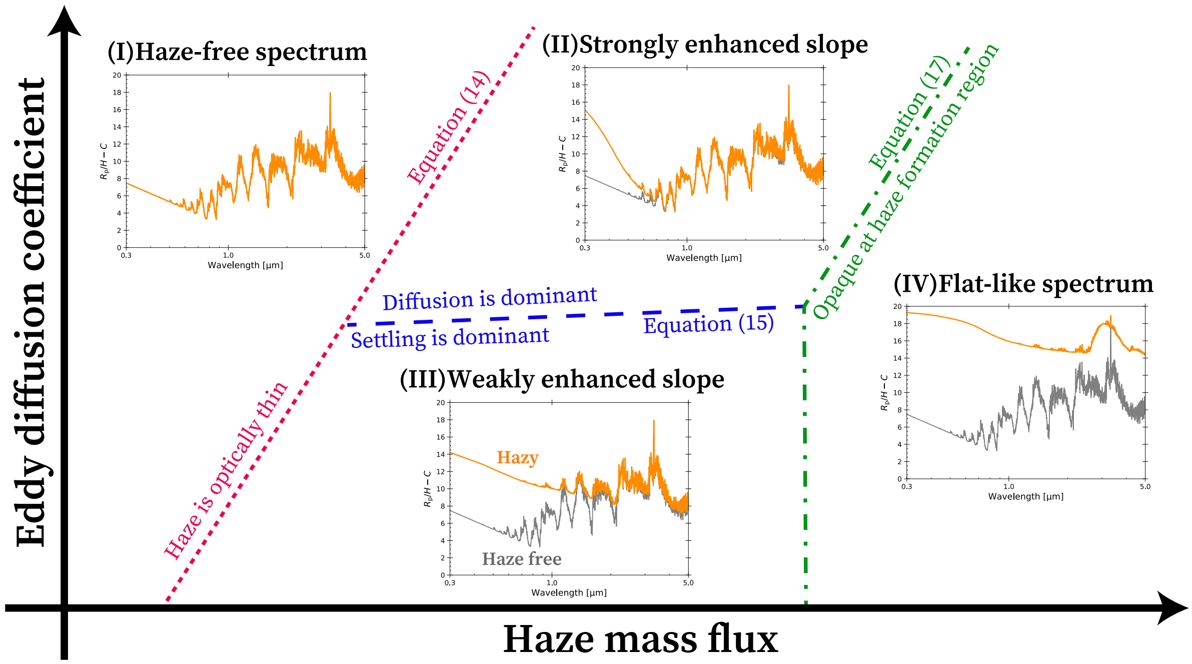

Figure 2: Transmission spectrum regimes in terms of haze mass flux and eddy diffusion coefficient. Each panel shows a typical shape of a transmission spectrum of a hazy atmosphere (orange lines) compared to a haze-free spectrum (gray lines). The super-Rayleigh slopes preferentially emerge in the regime (II) in which eddy diffusion dominates over gravitational settling of haze particles.

Transit least-squares survey. III. A $1.9\,R_\oplus$ transit candidate in the habitable zone of Kepler-160 and a nontransiting planet characterized by transit-timing variations

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Astronomy & Astrophysics, https://www.aanda.org/articles/aa/abs/2020/06/aa36929-19/aa36929-19.html
DOI:10.1051/0004-6361/201936929

The Sun-like star Kepler-160 (KOI-456) has been known to host two transiting planets, Kepler-160 b and c, of which planet c shows substantial transit-timing variations (TTVs). We studied the transit photometry and the TTVs of this system in our search for a suspected third planet. We used the archival Kepler photometry of Kepler-160 to search for additional transiting planets using a combination of our `Wōtan` detrending algorithm and our transit least-squares (`TLS`) detection algorithm. We also used the `Mercury` N-body gravity code to study the orbital dynamics of the system in trying to explain the observed TTVs of planet c. First, we recovered the known transit series of planets Kepler-160 b and c. Then we found a new transiting candidate with a radius of $1.91^{+0.17}_{-0.14}$ Earth radii ($R_\oplus$), an orbital period of $378.417^{+0.028}_{-0.025}$ d, and Earth-like insolation. The `vespa` software predicts that this signal has an astrophysical false-positive probability of $\mathrm{FPP}_3 = 1.8 \times 10^{-3}$ when the multiplicity of the system is taken into account. Kepler vetting diagnostics yield a multiple event statistic of $\mathrm{MES} = 10.7$, which corresponds to an $\sim 85\,\%$ reliability against false alarms due to instrumental artifacts such as rolling bands. We are also able to explain the observed TTVs of planet c with the presence of a previously unknown planet. The period and mass of this new planet, however, do not match the period and mass of the new transit candidate. Our Markov chain Monte Carlo simulations of the TTVs of Kepler-160 c can be conclusively explained by a new nontransiting planet with a mass between about 1 and 100 Earth masses and an orbital period between about 7 and 50 d. We conclude that Kepler-160 has at least three planets, one of which is the nontransiting planet Kepler-160 d. The expected stellar radial velocity amplitude caused by this new planet ranges between about 1 and $20\,\mathrm{m\,s^{-1}}$. We also find the super-Earth-sized transiting planet candidate KOI-456.04 in the habitable zone of this system, which could be the fourth planet.

Download/Website: `https://ui.adsabs.harvard.edu/abs/2020arXiv200602123H`

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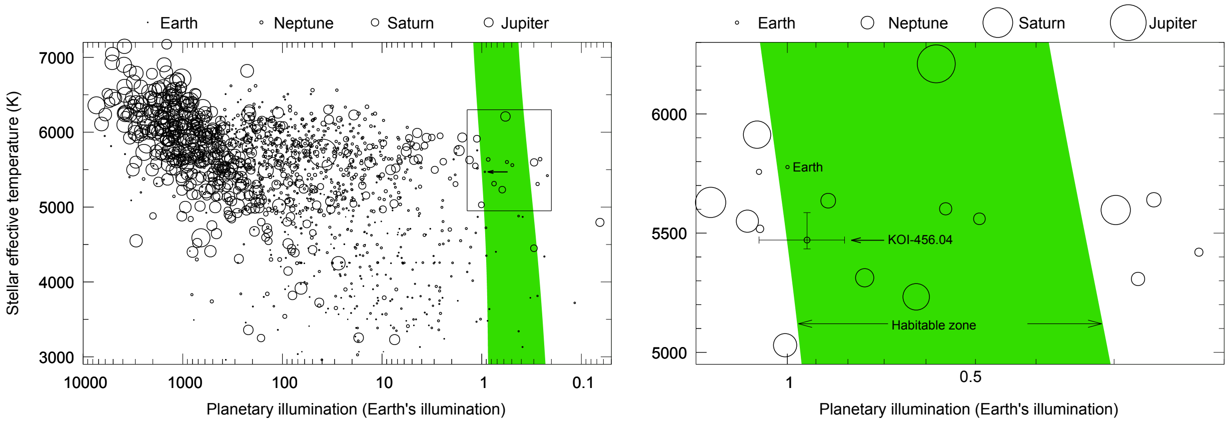

Figure 3: New transiting candidate KOI-456.04 in the context of the known extrasolar planet population. The position of the open circles indicates the stellar flux received at the top of the atmosphere and the effective temperature of the host star of all known transiting planets as listed in the Exoplanet Encyclopaedia (http://exoplanets.eu) on 29 April 2020. The sizes of the circles scale with the radii of the planets. The green shaded area denotes the habitable zone within the limits of the maximum greenhouse effect (right border) and the runaway greenhouse effect (left border). **(a)** The rectangle outlines the margins displayed in panel (b), and the arrow points at the new transiting candidate. **(b)** The Earth's position and size are indicated for reference. The new candidate is labeled with an arrow, and error bars refer to the 1 σ confidence intervals from our MCMC fits. Circles are to scale within each panel but not across panels.

Effects of Thermal Emission on the Transmission Spectra of Hot Jupiters

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The Astrophysical Journal, in press (arXiv:2006.04175)

The atmosphere on the dayside of a highly irradiated close-in gas giant (also known as a hot Jupiter) absorbs a significant part of the incident stellar radiation which again gets re-emitted in the infrared wavelengths both from the day and the night sides of the planet. The re-emitted thermal radiation from the night side facing the observers during the transit event of such a planet contributes to the transmitted stellar radiation. We demonstrate that the transit spectra at the infrared region get altered significantly when such re-emitted thermal radiation of the planet is included. We assess the effects of the thermal emission of the hot Jupiters on the transit spectra by simulating observational spectroscopic data with corresponding errors from the different channels of the upcoming James Webb Space Telescope. We find that the effect is statistically significant with respect to the noise levels of those simulated data. We also find that the transit spectra with thermal emission vary with the spectral types of the host stars significantly compared to these noise levels. Hence, we convey the important message that the planetary thermal re-emission must be taken into consideration in the retrieval models of transit spectra for hot Jupiters for a more accurate interpretation of the observed transit spectra.

Download/Website: `https://arxiv.org/abs/2006.04175`

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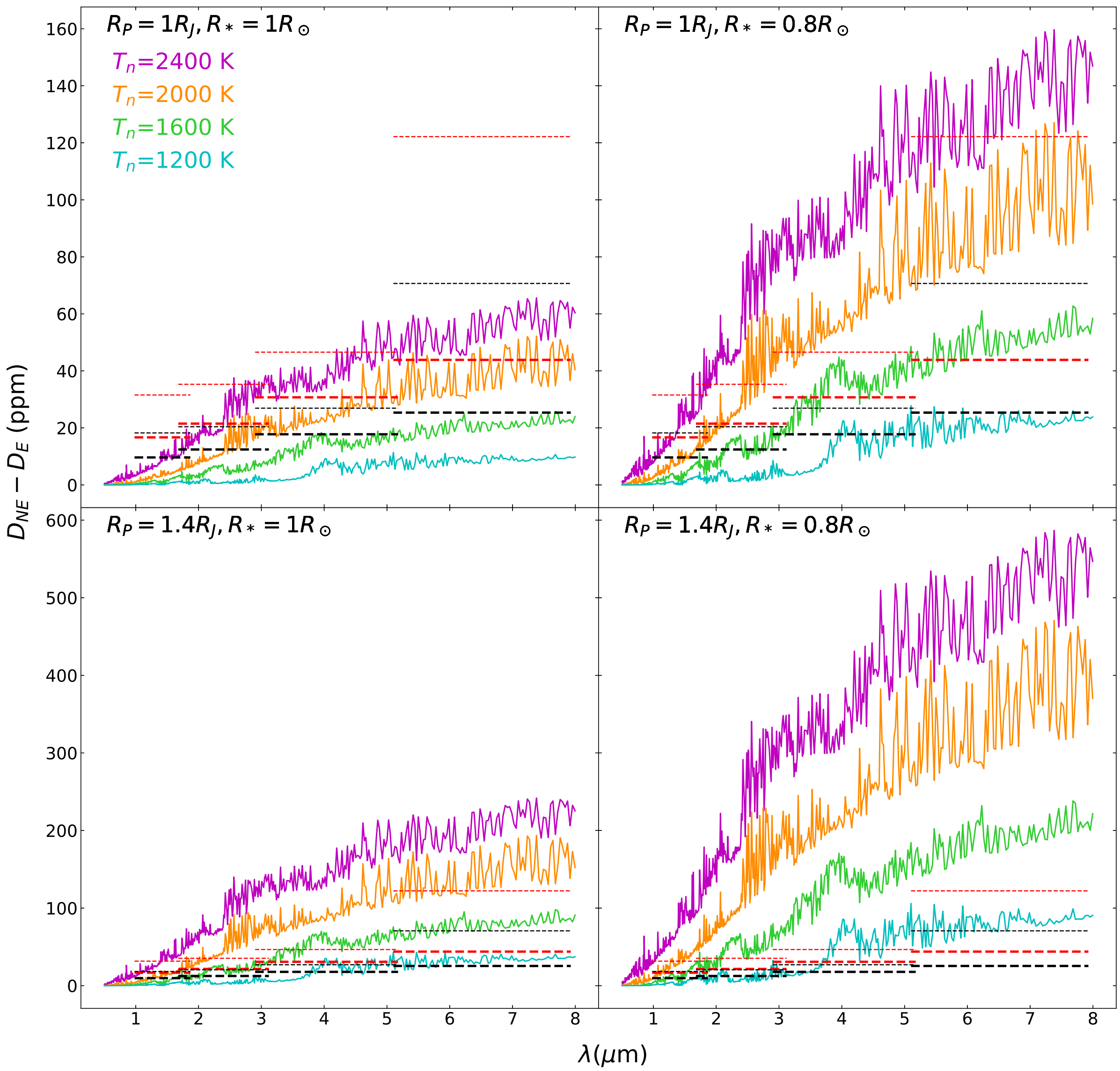

Figure 4: Difference between the models of transit depth without (D_{NE}) and with (D_E) thermal emission from the night-sides of the hot Jupiters for different values of average night-side temperature (T_n), planet raidus (R_P) and host star radius (R_*), keeping the surface gravity (g) fixed at 30m/s^2. The 1-σ noise-levels are shown in dashed lines from left to right for the JWST channels NIRSpec G140M, NIRSpec G235M, NIRSpec G395M and MIRI LRS (slitless) respectively. The red and black dashed lines correspond to noise-levels for number of observed transits equal to 2 and 4 respectively. The thick and thin dashed lines correspond to noise-levels for host stars with J-band magnitude of 8 and 10 respectively.

Planet Migration in Self-Gravitating Discs: Survival of Planets

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Monthly Notices of the Royal Astronomical Society, Accepted (arXiv:2006.03077)

We carry out three-dimensional SPH simulations to study whether planets can survive in self-gravitating protoplanetary discs. The discs modelled here use a cooling prescription that mimics a real disc which is only gravitationally unstable in the outer regions. We do this by modelling the cooling using a simplified method such that the cooling time in the outer parts of the disc is shorter than in the inner regions, as expected in real discs. We find that both giant ($> M_{\rm Sat}$) and low mass ($< M_{\rm Nep}$) planets initially migrate inwards very rapidly, but are able to slow down in the inner gravitationally stable regions of the disc without needing to open up a gap. This is in contrast to previous studies where the cooling was modelled in a more simplified manner where regardless of mass, the planets were unable to slow down their inward migration. This shows the important effect the thermodynamics has on planet migration. In a broader context, these results show that planets that form in the early stages of the discs' evolution, when they are still quite massive and self-gravitating, can survive.

Download/Website: `https://arxiv.org/abs/2006.03077`

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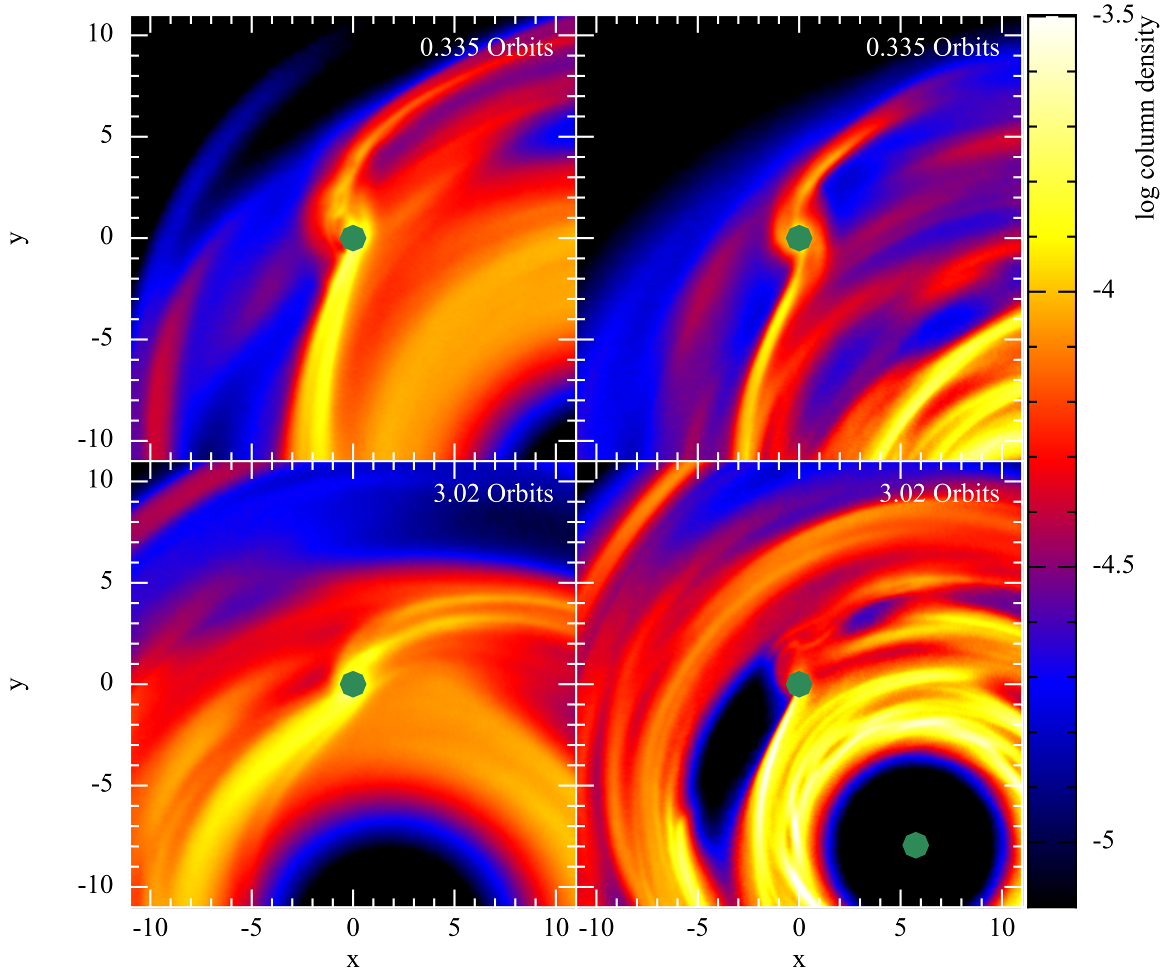

Figure 5: This figure shows how the surface density of the disc near a $1M_{\rm Jup}$ planet changes as it migrates in a variable β (left) and a constant β (right) disc. Top left panel is when the planet is rapidly migrating inward in a variable β disc. Bottom left is when the migration of the planet has slowed down. Top right is just before the planet starts rapidly migrating inwards in a constant β disc. Bottom right is when the planet is rapidly migrating inwards. When the surface density of the region in front and behind the planet is comparable, there is little migration (bottom left and top right). However when there is an under-dense region in front and and over-dense region behind, the planet migrates inwards (top left and bottom right).

3 Jobs and Positions

Postdoctoral Research Assistant in Exoplanet Atmosphere Modelling

Prof Jayne L Birkby
Oxford Astrophysics, Denys Wilkinson Building, University of Oxford, Keble Road, Oxford, OX1 3RH, UK

University of Oxford, UK, October 2020

Applications are invited for a Postdoctoral Research Assistant in Exoplanet Atmosphere Modelling.

The post is available initially for a fixed-term duration of 3 years. Candidates should be able to start no later than 1 October 2020.

We seek a curiosity driven researcher with a passion for modelling exoplanet atmospheres, and for exploring and proposing new theoretical avenues for exoplanet atmosphere follow-up. The researcher will join Prof Jayne Birkby's new group in Oxford as part of her ERC-funded project "exoZoo: High definition and time-resolved studies of exoplanet atmospheres".

The successful candidate will initially focus on high spectral resolution theoretical modelling of exoplanet atmospheres to enable the interpretation of such observations embedded as part of the exoZoo. The exoZoo aims to deliver detailed comparative exoplanetology to understand the incredible diversity of exoplanets and their formation pathways. It covers a wide range of planet mass and temperature for the successful candidate to explore in emission, reflection, or transmission across multiple resolutions. The successful candidate will also aid in simulations of exoplanet atmospheres designed to help prepare the ELTs for the remote exploration of rocky worlds. They will further be encouraged to form collaborations within the Oxford Network for Planets to support this.

Applicants should possess, or be very close to obtaining a doctorate in astronomy, planetary science, geoscience, or a closely related discipline.

Previous experience in radiative transfer, chemistry, or dynamics as applied to exoplanet atmospheres or at high spectral resolution will be an advantage. Candidates are expected to demonstrate the ability to carry out specific research projects independently, while working constructively within a larger team. Applications are particularly welcome from candidates who have been traditionally under-represented in academic posts.

The postholder will have the opportunity to teach.

Please direct enquiries about the role to Jayne Birkby (jbirkby@uva.nl)

You will be required to upload a brief statement of research interests, CV and 2 references should be sent direct to Leanne.odonnell@physics.ox.ac.uk

Application Deadline: Monday, June 22, 2020 (midday BST)

Download/Website: `https://jobregister.aas.org/ad/c15f34d9`
Download/Website: `https://tinyurl.com/OxfordExoPostdoc`

Contact: `jbirkby@uva.nl`

3 PhD positions in planetary science

Y.Alibert & W. Benz
[1] Theoretical Astrophysics and Planetary Science, University of Bern, Switzerland

Bern, Switzerland, Fall 2020

We are seeking qualified candidates to fill three 4-year PhD positions in exoplanet science in the research group of Yann Alibert and Willy Benz (University of Bern). The PhD positions are part of the TAPS (Theoretical Astrophysics and Planetary Science) group of the University of Bern and frequent interactions are foreseen with the Center for Space and Habitability (University of Bern) researchers as well as with the National Center of Competence in Research PlanetS. PlanetS is a large national framework in Switzerland that unifies Swiss efforts in planetary and exoplanetary science across Bern, Geneva, and Zurich. Additional informations on our research group, the CSH and the NCCR can be found using the links provided below.

The ideal candidates have a bachelor's and master's degree in physics, astrophysics, planetary sciences or equivalent. They should be enthusiastic, tenacious, communicative, and willing to integrate into the teams in Bern (TAPS and CSH) and more generally in the Swiss landscape of PlanetS. The research work consists of a combination of numerical modeling (developing and running computer codes mostly in Fortran and python) and analytical work.

The scientific goals of the three PhD projects span a variety of projects in planetary science and in particular aim at:

- studying the correlation between the internal structure of exoplanets orbiting the same star, using CHEOPS observations. CHEOPS is an ESA satellite successfully launched in December 2019 (P.I. Willy Benz). For this project, the PhD candidate will be working in close collaboration with members of the CHEOPS science team.

- developing population synthesis models (known as the Bern model, see e.g. Alibert et al. 2005, 2013, Emsenhuber et al., submitted) to improve the description of the disk of planetesimals. This project will involve building up on existing models of planetesimal growth and dynamical evolution, and studying the effect of these processes on the population of exoplanets.

- studying the formation of planetary systems taking into account the accretion of pebbles and planetesimals, following the scenario proposed in Alibert et al. (2018, Nature Astronomy). This project will involve combining existing models of planet formation by pebble accretion (Brügger et al. 2018, 2020) and by planetesimal accretion (e.g. Alibert et al. 2013, Emsenhuber et al., submitted) in a single framework.

The formal employment will be for 4 years at the University of Bern. There will be a standard first year of probation. The annual salary is set by a predetermined matrix from the Swiss National Fund. Child allowance and maternity/paternity leave are offered. There are ample funds for travel, publications and computers. The successful candidate will participate in group meetings, journal clubs, research discussions, attend seminars and colloquia, interact with research visitors, travel to conferences, etc., both in Bern and in the NCCR PlanetS. The start date is expected to be fall 2020, and is negotiable.

To apply, please send a motivation letter including a personal statement (maximum 1 page), a CV (maximum 2 pages), a list of publications (if applicable), transcripts of your grades of courses obtained during your bachelor's and master's degrees, and a cover letter (1 page). The entire application should be submitted as a single pdf file to Yann Alibert (alibert@space.unibe.ch). It is the responsibility of the applicant to ensure that furthermore, 2-3 letters of recommendation are sent directly by the letter writers to Y. Alibert, by the application deadline of 30. July 2020.

The university of Bern is an equal opportunity employer, and we specially encourage the application of female researchers.

Download/Website: `http://nccr-planets.ch/research/phase2/domain2/project5/`

Download/Website: `http://www.csh.unibe.ch`
Download/Website: `http://nccr-planets.ch`
Contact: `alibert@space.unibe.ch`

Faculty Positions in Planetary and Exoplanetary Sciences, School of Earth and Planetary Sciences (SEPS)

Dr. Liton Majumdar (on behalf of the NISER SEPS Search Committee)

India, Rolling Advertisement

The School of Earth and Planetary Sciences (SEPS) at National Institute of Science Education and Research (NISER), Bhubaneswar, India would like to inform you about the **new interdisciplinary centre** dedicated to leading the major research areas of solar system science such as terrestrial planets, outer planets and small bodies (comets, KBOs, rings, asteroids, meteorites, and dusts), astrochemistry, astrobiology, exoplanets (atmospheres, interiors, and formation mechanisms), future planetary/exoplanetary missions, instrumentations, and techniques. We aim to achieve our goals by deepening the collaborations between the planetary scientists, astrophysicists, astrobiologists, astrochemists, earth scientists, and atmospheric physicists. Current faculty members in SEPS are involved actively in Indian and large international collaborative projects and astronomy/planetary/exoplanetary missions, e.g., SKA, ALMA, Chandrayaan-2, NASA's JWST, SOFIA, and Dawn.

NISER SEPS is currently accepting potential faculty applications at various levels (Assistant Professor, Reader-F and Associate Professor):

Please find detailed information here:

https://www.niser.ac.in/seps/scholarship/faculty-position-0

Please apply through online here:

https://ims.niser.ac.in/OnlineRecruitmentApplication.action

Download/Website: `https://www.niser.ac.in/seps/`
Contact: `cpseps@niser.ac.in`

Residential fellowship "Exoplanets and Biological Activity on Other Worlds"

Ulrike Heiter, coordinator for SCAS-Exoplanets
Department of Physics and Astronomy, Uppsala University, Sweden

Swedish Collegium for Advanced Study, from Sep 2021

We would like to draw your attention to the opportunity to apply for a residential fellowship at the Swedish Collegium for Advanced Study (SCAS) in Uppsala, focusing on the theme "Exoplanets and Biological Activity on Other Worlds" within the Natural Sciences Programme.
Fellowships are normally awarded for either one academic year or one semester, although short-term visits (at least three months, within either autumn or spring semester) are possible.
At the time of application, the candidate must have held a PhD (or equivalent degree) for at least three years.
The deadline for applications for the academic year 2021-22 is on **1 July 2020**.
Further information and application instructions can be found on the Website linked below.

Download/Website: http://www.swedishcollegium.se/subfolders/Fellowships/Natural_Sciences.html

Contact: ulrike.heiter@physics.uu.se

4 Conferences

EPSC 2020 - EXO1 Formation and evolution of extrasolar systems

A. Crida[1]*, A.-S. Libert*[2]*, J. Teyssandier*[2]
[1] Université Côte d'Azur, Nice, France
[2] naXys, University of Namur, Belgium

Virtual meeting, 21 September – 9 October 2020

The late stage formation of planetary systems has a crucial impact on the final system configuration. A deep understanding of the architecture of both RV-detected systems and transit-detected systems is particularly important to get a unified vision of planetary system formation.

In this session we address the question of the formation, dynamical evolution and stability of planetary systems in a broad sense, including (but not restricted to) the effects of planet-disc interactions, resonances, high eccentricity migration, binary stars,...

EXO1 session will consist in asynchronous (offline) contributed oral presentations (10-minute long video recordings of talks accessible for the duration of the meeting), accompanied by a discussion forum for asynchronous Q&A. Early career scientists are encouraged to submit an abstract.

The abstract submission deadline is 24 June 2020, 13:00 CEST.

Download/Website: `https://meetingorganizer.copernicus.org/EPSC2020/session/38491`
Contact: `anne-sophie.libert@unamur.be`

NASA Exoplanet Program Analysis Group (ExoPAG) Meeting 22

Michael R. Meyer (on behalf of the ExoPAG Executive Committee)

Virtual Meeting, June 18-29

NASA's Exoplanet Exploration Program Analysis Group (ExoPAG) will hold its twenty second meeting on June 18th and 19th, 2020. This will be a fully virtual meeting, the Webex information can be found at the website listed below. ExoPAG meetings are open to the entire scientific community, and offer an opportunity to participate in discussions of scientific and technical issues in exoplanet exploration, and to provide input into NASA's Exoplanet Exploration Program (ExEP). All interested members of the astronomical and planetary science communities are invited to attend and participate. A draft agenda is available at the meeting website listed below. The meeting will run from Thursday June 18th, 2020 roughly 9:00 am to 1 pm (Pacific Daylight Time) to Friday, June 19 from 9 am to 1 pm (PDT).

Download/Website: `https://exoplanets.nasa.gov/exep/events/307/exopag-22-virtual-meeting/`

Contact: `mrmeyer@umich.edu`

5 Exoplanet Archive Updates

May Updates at the NASA Exoplanet Archive

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

Pasadena CA USA, June 16, 2020

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

Also, the new alpha release of the Planetary Systems table allows you to browse ALL the planet and host star solutions (`http://bit.ly/2Pt0tM1`), and clicking on a planet name in the table takes you to the planet's redesigned System Overview page.

May 22, 2020

More Improvements Coming: New and Updated Planetary Data Tables

The NASA Exoplanet Archive team's effort to provide a more integrated and streamlined user experience is still underway. Here is a quick update on our progress:

Last December, we announced the alpha release of the Planetary Systems Table (`http://bit.ly/2Pt0tM1`), which combines data from the Confirmed Planets and Extended Planet Data tables. This new table is also connected to a new Table Access Protocol (TAP) service (`https://bit.ly/2Tajkgk`).

Based on user feedback during this alpha period, we're planning to roll out an update to the Planetary Systems (PS) Table in the coming weeks. Also, we will soon add a new table, called the Planetary Systems Composite Parameters Table (PSCP). The older Confirmed Planets, Extended Planet Parameters, and Composite Parameters tables will continue to be maintained for the coming months—with the aim of decommissioning these tables near the end of the calendar year.

The PSCP Table's purpose is similar to our existing Composite Parameters Table: it's a more complete table of planet parameters combined from multiple references and calculations. The new Planetary Systems Composite Table will be built from the new Planetary Systems Table. Data from both the PS and PSCP tables will be available through our TAP service.

More details will be released in the coming weeks. In the meantime, you are welcome to contact us through social media or our Helpdesk ticketing system (`http://bit.ly/2uP9N1b`).

New Data This Week

We've added four confirmed planets and new emission and transmission spectra for WASP-76 b. The new planets are: HD 164922 d, WASP-150 b, WASP-176 b, and HD 332231 b.

Also, data for the following planets have been added to the Direct Imaging Table: 1RXS J160929.1-210524 b, GSC 06214-00210 b, PDS 70 b, and GQ Lup b.

Catch Us (Virtually) at Summer AAS!

The 236th American Astronomical Society (AAS) meeting, to be held June 1–3, is completely online this year. NASA Exoplanet Archive staff will be on hand in two virtual booths for webinars, demos, and QA. Come visit us! We'll be part of the IPAC Archives and NExScI booths in Exhibit Hall. Follow us on Twitter and Facebook for timely updates.

May 7, 2020

This week's update includes three new planets: KOI-1783.01, KOI-1783.02 and TOI-677 b. We've also added data for three directly imaged planets, kap And b, GSC 06214-00210 b, and 1RXS J160929.1-210524 b, to our new Direct Imaging Table (`http://bit.ly/3ayD185`).

Also, there are new transmission spectra for KELT-9 b, WASP-121 b, WASP-33 b, and HD 189733 b—all of which can be found in the Transmission Spectroscopy Table (`http://bit.ly/2B54JfR`).

Lastly, we've removed Fomalhaut b from the archive based on Gaspar Rieke (2020), who showed the observed source was more consistent with an expanding dust cloud around Fomalhaut rather than an orbiting planet.

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

Contact: `mharbut@caltech.edu`

6 Announcements

Exoplanet Demographics I Conference

J. Christiansen
NASA Exoplanet Science Institute, California Institute of Technology, Pasadena, CA, USA

Pasadena, CA, November 9-12, 2020

Registration is available for the first Exoplanet Demographics conference, hosted by the NASA Exoplanet Science Institute. It will be held November 9-12, 2020, and there is no registration fee.

Although we don't know what November will look like in terms of travel and safety, we are still planning to hold the Exoplanet Demographics Conference in November 2020. At minimum we will support virtual attendance and presentations, so that people can make their own decisions about the form of attendance which is most appropriate for their needs. The final conference format will either be a hybrid of in-person and virtual presentations, if the organizing committees deem that a safe possibility, or fully virtual.

This conference will bring together community members working both theoretically and observationally on understanding exoplanet demographics focusing on the following themes.

- What are the current limitations on our ability to discern the true underlying planet population from the observed distribution?
- What can the size and/or mass distribution of exoplanets teach us about the dominant planet formation, migration, and evolution pathways?
- What properties of stars affect the types of planets that form, and how can we use the properties of stars to study planet formation?
- What can we learn from planetary systems or disks around stellar remnants and substellar objects?
- How will upcoming missions advance our understanding of exoplanet demographics?

Contributed Talks and Poster Presentations: abstract submission by July 9 with notifications by August 6
Contributed talks are shorter (∼15 minute) presentations. We hope to accommodate as many requests as possible. We are also accepting abstracts for poster presentations and are still deciding how a virtual poster session would work.

Selection criteria: The SOC is committed to building an inclusive conference agenda, and is looking for ways to facilitate vibrant, thoughtful, and respectful discussions between all participants. Submissions are widely solicited and encouraged. Abstracts will be anonymously ranked in three career stage categories (student, postdoc, and staff) using three criteria: originality of the work, relevance to the conference themes, and results.

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

Contact: `exodem@ipac.caltech.edu`

2020 Sagan Summer Virtual Workshop: Extreme Precision Radial Velocity

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

July 20-24, 2020,

Registration is still open for the first virtual Sagan Summer Workshop! This workshop will provide an introduction to the basics of the PRV technique, a summary of planet demographics from PRV surveys, and an evaluation of the importance of planet masses and orbits to imaging missions and of the challenges in advancing PRV precision by the factor of 10-30 needed to detect terrestrial analogs in orbit around nearby solar type stars.

The workshop will take place via Zoom Webinar from July 20-24, with most of the presentations on July 20-23, earlier in the day Pacific time. The revised agenda for the virtual meeting is available on the workshop website. Some of the talks will be pre-recorded so attendees can become familiar with material ahead of the live meeting. We will also using Jupyter notebooks for the modified hands-on sessions and are planning to host virtual "lunch with the speakers."

As in previous years, we will record all talks for posting on the Sagan Summer Workshop YouTube channel: `https://www.youtube.com/channel/UCytsRiMvdj5VTZWfj6dBadQ/`. Please complete the free registration so that we can plan for our online attendance and communicate information for the workshop with attendees ahead of time and the receive the remote access information.

Download/Website: `http://nexsci.caltech.edu/workshop/2020`
Contact: `sagan_workshop@ipac.caltech.edu`

Special 2020B Call for Proposals for MINERVA-Australis

D. Ciardi
NASA Exoplanet Science Institute, California Institute of Technology, Pasadena, CA, USA

Due July 16, 2020 4 pm PDT,

The NASA Exoplanet Science Institute is announcing a special Call for Proposals to use the MINERVA-Australis facility as part of the NASA/NSF Exoplanet Observational Research Program (NN-EXPLORE). As part of the NN-EXPLORE program, NASA has entered into a partnership with the MINERVA-Australis consortium. MINERVA-Australis is a dedicated exoplanet observatory operated by the University of Southern Queensland (USQ) in Queensland, Australia. The MINERVA-Australis facility is suitable for observation programs requiring precision radial velocities such as individual measurements to constrain orbits and masses, RM-effect, or Doppler tomography, precision photometric observations such as transit observations, and spectroscopic stellar characterization.

NASA has made available to astronomers based at US institutions 285 hours on the Minerva-Australis facility for the 2020B semester. The time is intended for exoplanet research, primarily of TESS targets but other exoplanet science will be considered. Proposed observing time will be allocated in hours and must include all science and calibration observations necessary to accomplish the science.

Please read the Special Call for Proposals for complete guidelines and submission information.

Download/Website: `https://nexsci.caltech.edu/missions/Minerva/index.shtml`
Contact: `nnexplore@ipac.caltech.edu`

7 As seen on astro-ph

List of exoplanet related entries seen on astro-ph during May 2020.

May 2020

astro-ph/2005.00006: **NGTS-11 b / TIC-54002556 b: A transiting warm Saturn recovered from a TESS single-transit event** by *Samuel Gill et al.*

astro-ph/2005.00013: **TESS Hunt for Young and Maturing Exoplanets (THYME) II: A 17 Myr Old Transiting Hot Jupiter in the Sco-Cen Association** by *Aaron C. Rizzuto et al.*

astro-ph/2005.00047: **TESS Hunt for Young and Maturing Exoplanets (THYME) III: a two-planet system in the 400 Myr Ursa Major Group** by *Andrew W. Mann et al.*

astro-ph/2005.00786: **Visible and near-infrared observations of interstellar comet 2I/Borisov with the 10.4-m GTC and the 3.6-m TNG telescopes** by *J. de León et al.*

astro-ph/2005.01470: **Stellar impact on disequilibrium chemistry and on observed spectra of hot Jupiter atmospheres** by *D. Shulyak et al.*

astro-ph/2005.01542: **Microlensed Radio Emission from Exoplanets** by *Yuta Shiohira et al.*

astro-ph/2005.01668: **Laboratory studies on the viability of life in H2-dominated exoplanet atmospheres** by *S. Seager et al.*

astro-ph/2005.01684: **Original Research By Young Twinkle Students (ORBYTS): Ephemeris Refinement of Transiting Exoplanets** by *Billy Edwards et al.*

astro-ph/2005.01740: **A Coupled Analysis of Atmospheric Mass Loss and Tidal Evolution in XUV Irradiated Exoplanets: the TRAPPIST-1 Case Study** by *Juliette Becker et al.*

astro-ph/2005.01785: **A two-moment radiation hydrodynamics scheme applicable to simulations of planet formation in circumstellar disks** by *Julio David Melon Fuksman et al.*

astro-ph/2005.02114: **Consistently Simulating a Wide Range of Atmospheric Scenarios for K2-18b with a Flexible Radiative Transfer Module** by *M. Scheucher et al.*

astro-ph/2005.02374: **ARES I: WASP-76 b, A Tale of Two HST Spectra** by *Billy Edwards et al.*

astro-ph/2005.02423: **Photometry and Performance of SPECULOOS-South** by *C. A. Murray et al.*

astro-ph/2005.02468: **Coma Anisotropy and the Rotation Pole of Interstellar Comet 2I/Borisov** by *Yoonyoung Kim et al.*

astro-ph/2005.02528: **UV Exoplanet Transmission Spectral Features as Probes of Metals and Rainout** by *Joshua D. Lothringer et al.*

astro-ph/2005.02568: **The Hubble PanCET program: Transit and Eclipse Spectroscopy of the Strongly Irradiated Giant Exoplanet WASP-76b** by *Guangwei Fu et al.*

astro-ph/2005.02712: **Annular substructures in the transition disks around LkCa 15 and J1610** by *S. Facchini et al.*

astro-ph/2005.03020: **Simulating the Multi-Epoch Direct Detection Technique to Isolate the Thermal Emission of the Non-Transiting Hot Jupiter HD187123B** by *Cam Buzard et al.*

astro-ph/2005.03175: **Oxidation of the Interiors of Carbide Exoplanets** by *H. Allen-Sutter et al.*

astro-ph/2005.03368: **The GAPS Programme at TNG – XXIII. HD 164922 d: a close-in super-Earth discovered with HARPS-N in a system with a long-period Saturn mass companion** by *S. Benatti et al.*

astro-ph/2005.03431: **Global Hydromagnetic Simulations of Protoplanetary Disks with Stellar Irradiation and Simplified Thermochemistry** by *Oliver Gressel et al.*

astro-ph/2005.03635: **Stability of Jovian Trojans and their collisional families** by *Timothy R. Holt et al.*

astro-ph/2005.04233: **Earths in Other Solar Systems N-body simulations: the Role of Orbital Damping in Reproducing the Kepler Planetary Systems** by *Gijs D. Mulders et al.*

astro-ph/2005.04244: **Is the gap in the DS Tau disc hiding a planet?** by *Benedetta Veronesi et al.*

astro-ph/2005.05132: **Photoevaporation of the Jovian circumplanetary disk I. Explaining the orbit of Callisto and the lack of outer regular satellites** by *N. Oberg et al.*

astro-ph/2005.05153: **An Unusual Transmission Spectrum for the Sub-Saturn KELT-11b Suggestive of a Sub-Solar Water Abundance** by *Knicole D. Colón et al.*

astro-ph/2005.05540: **Explaining the Variations in Isotopic Ratios in Meteoritic Amino Acids** by *Michael A. Famiano et al.*

astro-ph/2005.05676: **The GAPS programme at TNG XXII. The GIARPS view of the extended helium atmosphere of HD189733 b accounting for stellar activity** by *G. Guilluy et al.*

astro-ph/2005.05841: **Survey of planetesimal belts with ALMA: gas detected around the Sun-like star HD 129590** by *Quentin Kral et al.*

astro-ph/2005.06521: **Orbital Stability of Exomoons and Submoons with Applications to Kepler 1625b-I** by *Marialis Rosario-Franco et al.*

astro-ph/2005.06525: **Constraining the final merger of contact binary(486958) Arrokoth with soft-sphere discrete element simulations** by *J. C. Marohnic et al.*

astro-ph/2005.06554: **Compositional Measurements of Saturn's Upper Atmosphere and Rings from Cassini INMS** by *J. Serigano et al.*

astro-ph/2005.06744: **N-body Simulations of Ring Formation Process around the Dwarf Planet Haumea** by *Iori Sumida et al.*

astro-ph/2005.07086: **A possible transit of a disintegrating exoplanet in the nearby multiplanet system DMPP-1** by *Mark H. Jones et al.*

astro-ph/2005.07199: **A Gas Giant Planet in the OGLE-2006-BLG-284L Stellar Binary System** by *David P. Bennett et al.*

astro-ph/2005.07203: **TESS Data for Asteroseismology: Timing verification** by *Carolina von Essen et al.*

astro-ph/2005.07709: **Frankenstein: Protoplanetary disc brightness profile reconstruction at sub-beam resolution with a rapid Gaussian process** by *Jeff Jennings et al.*

astro-ph/2005.07951: **Erosion of planetesimals by gas flow** by *Noemi Schaffer et al.*

astro-ph/2005.08850: **VLT/SPHERE survey for exoplanets around young, early-type stars including systems with multi-belt architectures** by *M. Lombart et al.*

astro-ph/2005.09064: **Possible evidence of ongoing planet formation in AB Aurigae. A showcase of the SPHERE/ALMA synergy** by *A. Boccaletti et al.*

astro-ph/2005.09615: **ARES II: Characterising the Hot Jupiters WASP-127 b, WASP-79 b and WASP-62 b with HST** by *Nour Skaf et al.*

astro-ph/2005.09631: **Confirmation of water emission in the dayside spectrum of the ultrahot Jupiter WASP-121b** by *Thomas Mikal-Evans et al.*

astro-ph/2005.09895: **Jupiter in the ultraviolet: acetylene and ethane abundances in the stratosphere of Jupiter from Cassini observations between 0.15 and 0.19 m** by *Henrik Melin et al.*

astro-ph/2005.10077: **Characterising brown dwarf companions with IRDIS long-slit spectroscopy: HD 1160 B and HD 19467 B** by *D. Mesa et al.*

astro-ph/2005.10105: **The correlation between photometric variability and radial velocity jitter, based on TESS and HARPS observations** by *S. Hojjatpanah et al.*

astro-ph/2005.10312: **Orbital and spectral characterization of the benchmark T-type brown dwarf HD 19467B** by *A.-L. Maire et al.*

astro-ph/2005.10722: **Binary-induced spiral arms inside the disc cavity of AB Aurigae** by *Pedro P. Poblete et al.*

astro-ph/2005.10868: **Giant planet formation at the pressure maxima of protoplanetary disks II. A hybrid accretion scenario** by *O. M. Guilera et al.*

astro-ph/2005.10958: **Recurring Outbursts of P/2019 LM4 (Palomar)** by *Quanzhi Ye et al.*

astro-ph/2005.10959: **K2-HERMES II. Planet-candidate properties from K2 Campaigns 1-13** by *Robert A. Wittenmyer et al.*

astro-ph/2005.10974: **The Preservation of Super Earths and the Emergence of Gas Giants after Their Progenitor Cores have Entered the Pebble Isolation Phase** by *Yi-Xian Chen et al.*

astro-ph/2005.11293: **The HST PanCET Program: An Optical to Infrared Transmission Spectrum of HAT-P-32Ab** by *Munazza K. Alam et al.*

astro-ph/2005.11565: **Retrieval of Particle Size Distribution of Polar Stratospheric Clouds Based on Wide-Angle Color and Polarization Analysis** by *Oleg S. Ugolnikov et al.*

astro-ph/2005.11725: **Strong H-alpha emission and signs of accretion in a circumbinary planetary mass companion from MUSE** by *Simon Eriksson et al.*

astro-ph/2005.11939: **Aerosol Composition of Hot Giant Exoplanets Dominated by Silicates and Hydrocarbon Hazes** by *Peter Gao et al.*

astro-ph/2005.11974: **Gas and dust dynamics in starlight-heated protoplanetary disks** by *Mario Flock et al.*

astro-ph/2005.12030: **Activity of (6478) Gault during January 13 - March 28, 2019** by *Oleksandra Ivanova et al.*

astro-ph/2005.12114: **Revisiting Proxima with ESPRESSO** by *A. Suárez Mascareño et al.*

astro-ph/2005.12281: **A PSF-based Approach to TESS High quality data Of Stellar clusters (PATHOS) – II. Search for exoplanets in open clusters of the southern ecliptic hemisphere and their frequency** by *D. Nardiello et al.*

astro-ph/2005.13002: **Implications of different stellar spectra for the climate of tidally-locked Earth-like exoplanets** by *Jake K. Eager et al.*

astro-ph/2005.13035: **Detection of exomoons in simulated light curves with a regularized convolutional neural network** by *Rasha Alshehhi et al.*

astro-ph/2005.13059: **On the local and global properties of the gravitational spheres of influence** by *D. Souami et al.*

astro-ph/2005.13200: **On The Geological Time Evolution of Volcanism in the Inner Solar System** by *Varnana.M.Kumar et al.*

astro-ph/2005.13540: **A Long-lived Sharp Disruption on the Lower Clouds of Venus** by *J. Peralta et al.*

astro-ph/2005.13560: **Following the TraCS of exoplanets with Pan-Planets: Wendelstein-1b and Wendelstein-2b** by *Christian Obermeier et al.*

astro-ph/2005.13562: **Enrichment of the HR 8799 planets by minor bodies and dust** by *K. Frantseva et al.*

astro-ph/2005.13586: **ExoMol line lists – XXXVIII. High-temperature molecular line list of silicon dioxide (SiO2)** by *A. Owens et al.*

astro-ph/2005.13700: **The dust-to-gas ratio, size distribution, and dust fall-back fraction of comet 67P/Churyumov-Gerasimenko: Inferences from linking the optical and dynamical properties of the inner comae** by *Raphael Marschall et al.*

astro-ph/2005.14008: **Scheduling ESPRESSO follow-up of TESS Targets. I. Myopic versus non-myopic sampling** by *Lorenzo Cabona et al.*

astro-ph/2005.14083: **A Hermite-Gaussian Based Radial Velocity Estimation Method** by *Parker Holzer et al.*

astro-ph/2005.14101: **Charon: A brief history of tides** by *Alyssa Rose Rhoden et al.*

astro-ph/2005.14116: **Rocklines as Cradles for Cosmic Spherules** by *Artyom Aguichine et al.*

astro-ph/2005.14185: **The Effect of Substellar Continent Size on Ocean Dynamics of Proxima Centauri b** by *Andrea M. Salazar et al.*

astro-ph/2005.14595: **Mineral cloud and hydrocarbon haze particles in the atmosphere of the hot Jupiter JWST target WASP-43b** by *Ch. Helling et al.*

astro-ph/2005.14668: **MaBlS-2: high-precision microlensing modelling for the large-scale survey era** by *David Specht et al.*

astro-ph/2005.14671: **The Gaia-Kepler Stellar Properties Catalog. II. Planet Radius Demographics as a Function of Stellar Mass and Age** by *Travis A. Berger et al.*

astro-ph/2005.00272: **TESS Asteroseismic Analysis of the Known Exoplanet Host Star HD 222076** by *Chen Jiang et al.*

astro-ph/2005.00505: **Properties and characteristics of the WFIRST H4RG-10 detectors** by *Gregory Mosby et al.*

astro-ph/2005.00861: **The big sibling of AU Mic: a cold dust-rich debris disk around CP-72 2713 in the Pic moving group** by *A. Moór et al.*

astro-ph/2005.01140: **Portuguese SKA White Book** by *Domingos Barbosa et al.*

astro-ph/2005.01652: **Tidal Interaction between the UX Tauri Disk A/C System Revealed by ALMA** by *Luis A. Zapata et al.*

astro-ph/2005.01687: **HAZMAT VI: The Evolution of Extreme Ultraviolet Radiation Emitted from Early M Star** by *Sarah Peacock et al.*

astro-ph/2005.02424: **The Search for MeV Electrons 2-45 AU from the Sun with the Alice Instrument Microchannel Plate Detector Aboard New Horizons** by *B. A. Keeney et al.*

astro-ph/2005.02717: **Solar-type Stars Observed by LAMOST and Kepler** by *Jinghua Zhang et al.*

astro-ph/2005.03578: **Outbursts in Global Protoplanetary Disk Simulations** by *Kundan Kadam et al.*

astro-ph/2005.03657: **Multi-Epoch VLBI of L Dwarf Binary 2MASS J0746+2000AB: Precise Mass Measurements and Confirmation of Radio Emission from Both Components** by *Qicheng Zhang et al.*

astro-ph/2005.04336: **Optical and X-ray observations of stellar flares on an active M dwarf AD Leonis with Seimei Telescope, SCAT, NICER and OISTER** by *Kosuke Namekata et al.*

astro-ph/2005.05223: **HD43587: a primary CoRoT target under a Maunder minimum phase?** by *Rafael Ramon Ferreira et al.*

astro-ph/2005.06246: **The CARMENES search for exoplanets around M dwarfs. The He I infrared triplet lines in PHOENIX models of M2-3 V stars** by *D. Hintz et al.*

astro-ph/2005.06426: **A new class of discontinuous solar wind solutions** by *Bidzina M. Shergelashvili et al.*

astro-ph/2005.06749: **Hunt for Starspots in HARPS Spectra of G and K Stars** by *Brett M. Morris et al.*

astro-ph/2005.06906: **Large-scale changes of the cloud coverage in the Indi Ba,Bb system** by *J. A. Hitchcock et al.*

astro-ph/2005.06932: **The inner disk of RY Tau: evidence of stellar occultation by the disk atmosphere at the sublimation rim from K-band continuum interferometry** by *Claire L. Davies et al.*

astro-ph/2005.07096: **WISE J135501.90-825838.9 is a Nearby, Young, Extremely Low-mass Substellar Binary** by *C. A. Theissen et al.*

astro-ph/2005.07526: **Chemical Composition of Bright Stars in the Continuous Viewing Zone of the TESS Space Mission** by *G. Tautvaišienė et al.*

astro-ph/2005.09037: **Gap, shadows, spirals, streamers: SPHERE observations of binary-disk interactions in GG Tau A** by *M. Keppler et al.*

astro-ph/2005.09273: **Hybrid star HD 81817 accompanied by brown dwarf or substellar companion** by *Tae-Yang Bang et al.*

astro-ph/2005.09364: **Grain growth in newly discovered young eruptive stars** by *Á. Kóspál et al.*

astro-ph/2005.09657: **Persistent starspot signals on M dwarfs: multi-wavelength Doppler observations with the Habitable-zone Planet Finder and Keck/HIRES** by *Paul Robertson et al.*

astro-ph/2005.09730: **Hints of a Population of Solar System Analog Planets from ALMA** by *Deryl Long et al.*

astro-ph/2005.09846: **Detailed chemical compositions of planet hosting stars: I. Exploration of possible planet signatures** by *F. Liu et al.*

astro-ph/2005.10253: **PTFO 8-8695: Two Stars, Two Signals, No Planet** by *L. G. Bouma et al.*

astro-ph/2005.10597: **Revisited reference solar proton event of 23-Feb-1956: Assessment of the cosmogenic-isotope method sensitivity to extreme solar events** by *Ilya G. Usoskin et al.*

astro-ph/2005.11330: **Observed sizes of planet-forming disks trace viscous evolution** by *L. Trapman et al.*

astro-ph/2005.11333: **Evolution of gas disc-embedded intermediate mass ratio inspirals in the LISA band** by *A. Derdzinski et al.*

astro-ph/2005.11587: **The Space Environment and Atmospheric Joule Heating of the Habitable Zone Exoplanet TOI700-d** by *O. Cohen et al.*

astro-ph/2005.12097: **On-sky verification of Fast and Furious focal-plane wavefront sensing: Moving forward toward controlling the island effect at Subaru/SCExAO** by *Steven P. Bos et al.*

astro-ph/2005.12336: **Exploration of the outer solar system with fast and small sailcraft** by *Slava G. Turyshev et al.*

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