ExoPlanet News
An Electronic Newsletter

No. 163, 10 January 2023

Editors: J. Davoult, E. Alei, H. Wang, D. Angerhausen & T.-E. Riesen
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exoplanetnews@nccr-planets.ch http://nccr-planets.ch/exoplanetnews

Contents

1 Editorial

The editorial team wishes you all the best for this new year and welcome to edition 163, the first edition of ExoPlanet News for 2023!

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 remind you that we recently introduced a new feature with clickable urls and hyperlinks (e.g., to astro-ph articles). The new feature is still at the experimental phase, so we are keen to receive any problem report as well as feedback.

For the next month we look forward to your paper abstracts, job ads or meeting announcements. 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 on February 14, 2023.

We wish you all a good start to the year!

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

Jeanne Davoult
Eleonora Alei
Haiyang Wang
Daniel Angerhausen
Timm-Emanuel Riesen

2 Abstracts of refereed papers

Radial velocity confirmation of a hot super-Neptune discovered by TESS with a warm Saturn-mass companion

E. Knudstrup[1,2] *et al.*

[1] Stellar Astrophysics Centre, Department of Physics and Astronomy, Aarhus University, Ny Munkegade 120, DK-8000 Aarhus C, Denmark
[2] Nordic Optical Telescope, Rambla José Ana Fernández Pérez 7, ES-38711 Breña Baja, Spain

Monthly Notices of the Royal Astronomical Society, in press (2022MNRAS.tmp.3440K)

We report the discovery and confirmation of the planetary system TOI-1288. This late G dwarf harbours two planets: TOI-1288 b and TOI-1288 c. We combine TESS space-borne and ground-based transit photometry with HARPS-N and HIRES high-precision Doppler measurements, which we use to constrain the masses of both planets in the system and the radius of planet b. TOI-1288 b has a period of $2.699835^{+0.000004}_{-0.000003}$ d, a radius of 5.24 ± 0.09 $R_\oplus$, and a mass of 42 ± 3 $M_\oplus$, making this planet a hot transiting super-Neptune situated right in the Neptunian desert. This desert refers to a paucity of Neptune-sized planets on short period orbits. Our 2.4-year-long Doppler monitoring of TOI-1288 revealed the presence of a Saturn-mass planet on a moderately eccentric orbit ($0.13^{+0.07}_{-0.09}$) with a minimum mass of 84 ± 7 $M_\oplus$ and a period of 443^{+11}_{-13} d. The 5 sectors worth of TESS data do not cover our expected mid-transit time for TOI-1288 c, and we do not detect a transit for this planet in these sectors.

Download/Website: `https://ui.adsabs.harvard.edu/abs/2022MNRAS.tmp.3440K/abstract`

Contact: `emil@phys.au.dk`

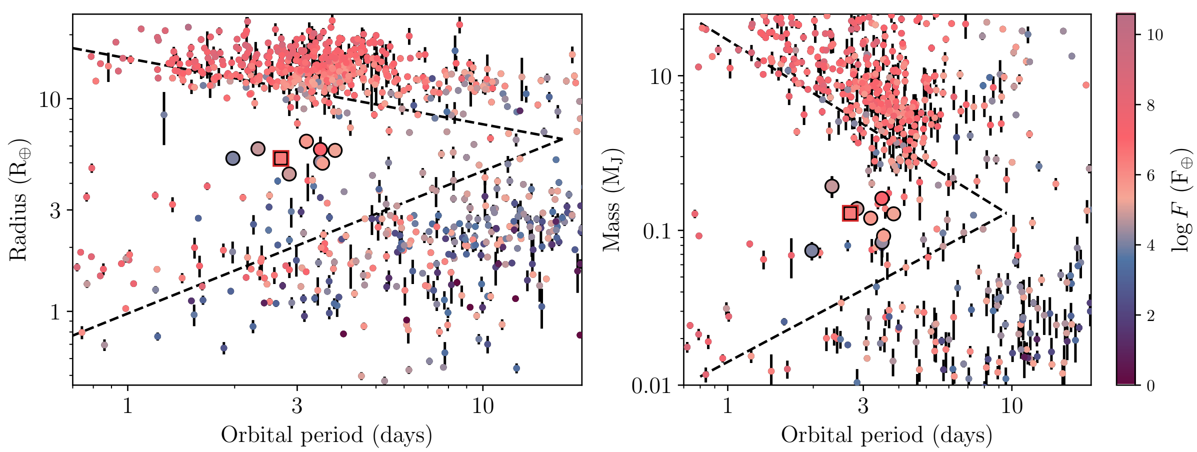

Figure 1: **The hot Neptunian desert** reported in in Mazeh et al. 2016 shown as dashed lines. Planets (as of September 2022) from the `TEPCat` catalogue of "well-studied transiting planets" (Southworth 2011, `https://www.astro.keele.ac.uk/jkt/tepcat/allplanets-noerr.html`) with uncertainties smaller than 30% in radius (left) and mass (right). The points are colour coded according to the incident flux, which is truncated at $F = 1$ $F_\oplus$. TOI-1288 b is shown as the large square with a red outline. The large circles denote the closest eight planets to TOI-1288 b in the radius-period parameter space, with their position highlighted in the mass-radius diagram as well.

Limb darkening measurements from TESS and Kepler light curves of transiting exoplanets

Pierre F. L. Maxted
Astrophysics group, Keele University, Staffs, ST5 5BG, UK

Monthly Notices of the Royal Astronomical Society, in press (arXiv:2212.09117)

Inaccurate limb-darkening models can be a significant source of error in the analysis of the light curves for transiting exoplanet and eclipsing binary star systems. To test the accuracy of published limb-darkening models, I have compared limb-darkening profiles predicted by stellar atmosphere models to the limb-darkening profiles measured from high-quality light curves of 43 FGK-type stars in transiting exoplanet systems observed by the Kepler and TESS missions. The comparison is done using the parameters $h'_1 = I_\lambda(\frac{2}{3})$ and $h'_2 = h'_1 - I_\lambda(\frac{1}{3})$, where $I_\lambda(\mu)$ is the specific intensity emitted in the direction μ, the cosine of the angle between the line of sight and the surface normal vector. These parameters are straightforward to interpret and insensitive to the details of how they are computed. I find that most (but not all) tabulations of limb-darkening data agree well with the observed values of h'_1 and h'_2. There is a small but significant offset $\Delta h'_1 \approx 0.006$ compared to the observed values that can be ascribed to the effect of a mean vertical magnetic field strength $\approx 100\,\mathrm{G}$ that is expected in the photospheres of these inactive solar-type stars but that is not accounted for by typical stellar model atmospheres. The implications of these results for the precision of planetary radii measured by the PLATO mission are discussed briefly.

Contact: `p.maxted@keele.ac.uk`

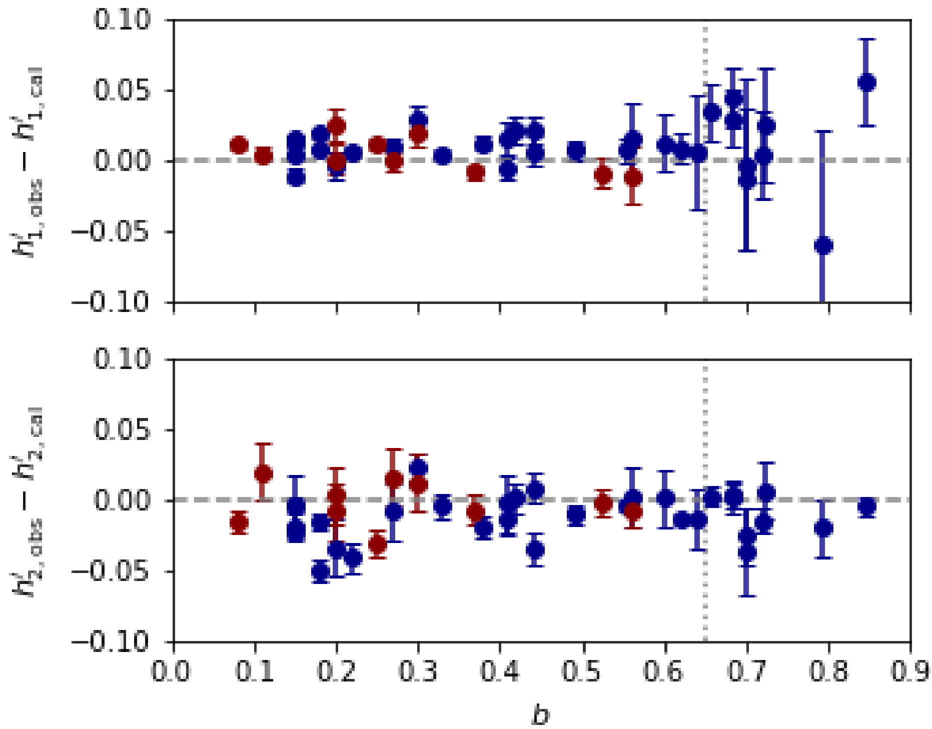

Figure 2: Comparison of observed values of h'_1 and h'_2 to predicted values calculated using the "Set 2" models from Kostogryz et al. (2022) as a function of impact parameter, b. Points for stars observed using *Kepler* and *TESS* are colour-coded blue and red, respectively.

Eureka!: An End-to-End Pipeline for JWST Time-Series Observations

T. J. Bell[1], *E.-M. Ahrer*[2], *J. Brande*[3], *A. L. Carter*[4], *A. D. Feinstein*[5], *G. Guzman Caloca*[6], *M. Mansfield*[7,8], *S. Zieba*[9], *C. Piaulet*[10], *B. Benneke*[10], *J. Filippazzo*[11], *E. M. May*[12], *P.-A. Roy*[10], *L. Kreidberg*[9], *K. B. Stevenson*[12]

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[3] Department of Physics and Astronomy, University of Kansas, 1082 Malott, 1251 Wescoe Hall Dr., Lawrence, KS 66045, USA
[4] Department of Astronomy and Astrophysics, University of California, Santa Cruz, 1156 High Street, Santa Cruz, CA 95064, USA
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[6] Department of Astronomy, University of Maryland, College Park, MD USA
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[10] Department of Physics and Institute for Research on Exoplanets, Université de Montréal, Montreal, QC, Canada
[11] Space Telescope Science Institute, 3700 San Martin Drive, Baltimore, MD 21218, USA
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Journal of Open Source Software, published (2022JOSS....7.4503B)

`Eureka!` is a data reduction and analysis pipeline for exoplanet time-series observations, with a particular focus on James Webb Space Telescope (JWST, Gardner et al., 2006) data. JWST was launched on December 25, 2021 and over the next 1-2 decades will pursue four main science themes: Early Universe, Galaxies Over Time, Star Lifecycle, and Other Worlds. Our focus is on providing the astronomy community with an open source tool for the reduction and analysis of time-series observations of exoplanets in pursuit of the fourth of these themes, Other Worlds. The goal of `Eureka!` is to provide an end-to-end pipeline that starts with raw, uncalibrated FITS files and ultimately yields precise exoplanet transmission and/or emission spectra. The pipeline has a modular structure with six stages, and each stage uses a "Eureka! Control File" (ECF; these files use the .ecf file extension) to allow for easy control of the pipeline's behavior. Stage 5 also uses a "Eureka! Parameter File" (EPF; these files use the .epf file extension) to control the fitted parameters. We provide template ECFs for the MIRI (Rieke et al., 2015), NIRCam (Horner & Rieke, 2004), NIRISS (Maszkiewicz, 2017), and NIRSpec (Bagnasco et al., 2007) instruments on JWST and the WFC3 instrument (Kimble et al., 2008) on the Hubble Space Telescope (HST, Bahcall, 1986). These templates give users a good starting point for their analyses, but `Eureka!` is not intended to be used as a black box tool, and users should expect to fine-tune some settings for each observation in order to achieve optimal results. At each stage, the pipeline creates intermediate figures and outputs that allow users to compare `Eureka!`'s performance using different parameter settings or to compare `Eureka!` with an independent pipeline. The ECF used to run each stage is also copied into the output folder from each stage to enhance reproducibility. Finally, while `Eureka!` has been optimized for exoplanet observations (especially the latter stages of the code), much of the core functionality could also be repurposed for JWST time-series observations in other research domains thanks to `Eureka!`'s modularity.

Download/Website: `https://joss.theoj.org/papers/10.21105/joss.04503`

Contact: `bell@baeri.org`

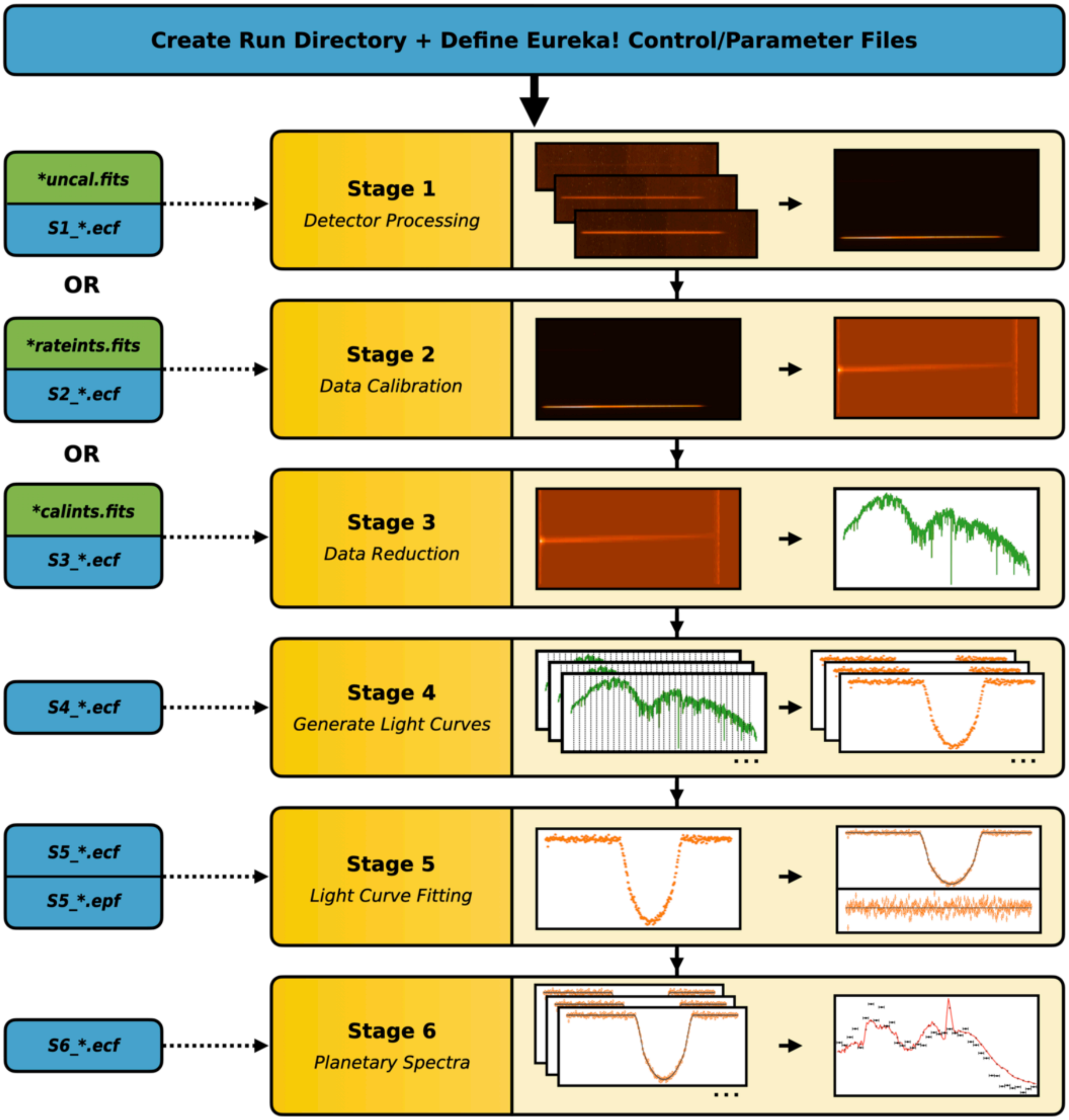


Figure 3: An overview flowchart showing the processing done at each stage in `Eureka!`. The outputs of each stage are used as the inputs to the subsequent stage along with the relevant settings file(s).

A framework for the architecture of exoplanetary systems. I. Four classes of planetary system architecture

L. Mishra[1,2], *Y. Alibert*[1], *S. Udry*[2], *C. Mordasini*[1]
[1] Institute of Physics, University of Bern, Gesellschaftsstrasse 6, 3012 Bern, Switzerland
[2] Geneva Observatory, University of Geneva, Chemin Pegasi 51b, 1290 Versoix, Switzerland

Astronomy & Astrophysics, in press (arXiv:2301.02374)

We present a novel, model-independent framework for studying the architecture of an exoplanetary system at the system level. This framework allows us to characterise, quantify, and classify the architecture of an individual planetary system. Our aim in this endeavour is to generate a systematic method to study the arrangement and distribution of various planetary quantities within a single planetary system. We propose that the space of planetary system architectures be partitioned into four classes: similar, mixed, anti-ordered, and ordered. We applied our framework to observed and synthetic multi-planetary systems, thereby studying their architectures of mass, radius, density, core mass, and the core water mass fraction. We explored the relationships between a system's (mass) architecture and other properties. Our work suggests that: (a) similar architectures are the most common outcome of planet formation; (b) internal structure and composition of planets shows a strong link with their system architecture; (c) most systems inherit their mass architecture from their core mass architecture; (d) most planets that started inside the ice line and formed in-situ are found in systems with a similar architecture; and (e) most anti-ordered systems are expected to be rich in wet planets, while most observed mass ordered systems are expected to have many dry planets. We find, in good agreement with theory, that observations are generally biased towards the discovery of systems whose density architectures are similar, mixed, or anti-ordered. This study probes novel questions and new parameter spaces for understanding theory and observations. Future studies may utilise our framework to not only constrain the knowledge of individual planets, but also the multi-faceted architecture of an entire planetary system. We also speculate on the role of system architectures in hosting habitable worlds.

Download/Website: `https://arxiv.org/abs/2301.02374`

Contact: `exomishra@gmail.com`

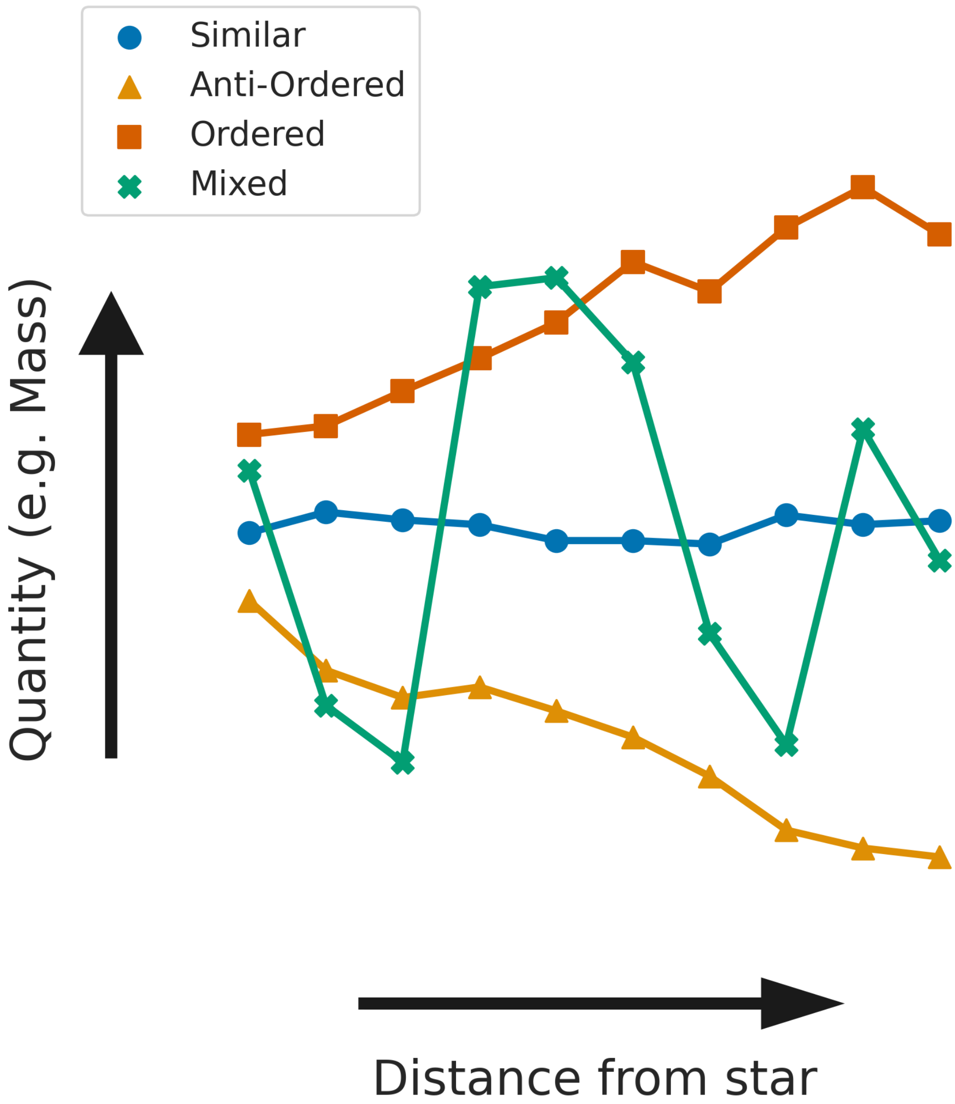


Figure 4: This schematic diagram shows the four architecture classes: similar, anti-ordered, mixed, and ordered. Depending on how a quantity (e.g. mass or size) varies from one planet to another, the architecture of a system can be identified.

Figure 5: Artist impression (Nina Rosa 2021, Geneva)

A framework for the architecture of exoplanetary systems. II. Nature versus nurture: Emergent formation pathways of architecture classes

L. Mishra[1,2], Y. Alibert[1], S. Udry[2], C. Mordasini[1]

[1] Institute of Physics, University of Bern, Gesellschaftsstrasse 6, 3012 Bern, Switzerland
[2] Geneva Observatory, University of Geneva, Chemin Pegasi 51b, 1290 Versoix, Switzerland

Astronomy & Astrophysics, in press (arXiv:2301.02373)

In the first paper of this series, we proposed a model-independent framework for characterising the architecture of planetary systems at the system level. There are four classes of planetary system architecture: similar, mixed, anti-ordered, and ordered. In this paper, we investigate the formation pathways leading to these four architecture classes. To understand the role of nature versus nurture in sculpting the final (mass) architecture of a system, we apply our architecture framework to synthetic planetary systems – formed via core-accretion – using the Bern model. General patterns emerge in the formation pathways of the four architecture classes. Almost all planetary systems emerging from protoplanetary disks whose initial solid mass was less than one Jupiter mass are similar. Systems emerging from heavier disks may become mixed, anti-ordered, or ordered. Increasing dynamical interactions (planet-planet, planet-disk) tends to shift a system's architecture from mixed to anti-ordered to ordered. Our model predicts the existence of a new metallicity-architecture correlation. Similar systems have very high occurrence around low-metallicity stars. The occurrence of the anti-ordered and ordered classes increases with increasing metallicity. The occurrence of mixed architecture first increases and then decreases with increasing metallicity. In our synthetic planetary systems, the role of nature is disentangled from the role of nurture. Nature (or initial conditions) pre-determines whether the architecture of a system becomes similar; otherwise nurture influences whether a system becomes mixed, anti-ordered, or ordered. We propose the 'Aryabhata formation scenario' to explain some planetary systems which host only water-rich worlds. We finish this paper with a discussion of future observational and theoretical works that may support or refute the results of this paper.

Download/Website: `https://arxiv.org/abs/2301.02373`

Contact: `exomishra@gmail.com`

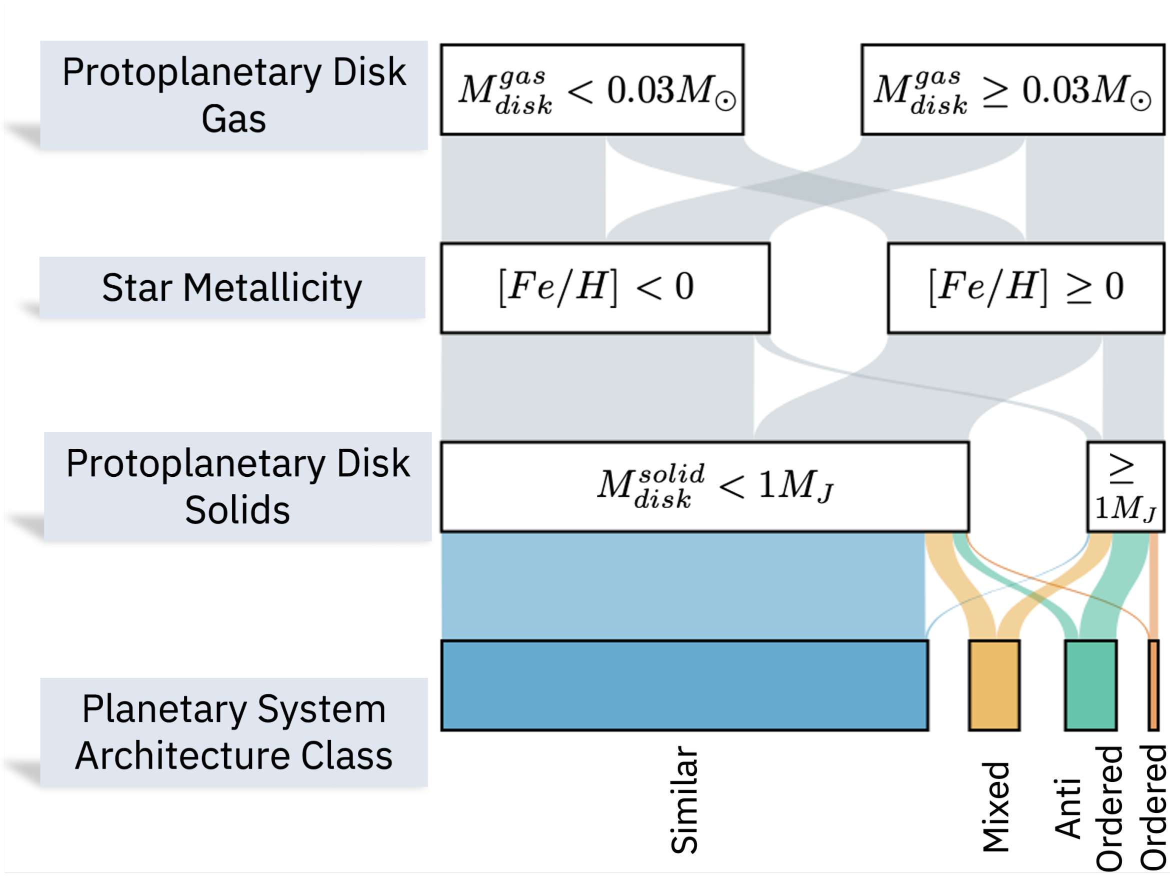


Figure 6: Emergence of formation pathways: Sankey diagram depicting the emergence of formation pathways of architecture classes. The thickness of the links and nodes is proportional to the relative number of synthetic systems in our simulation. This result is derived from synthetic planetary systems around a solar mass star via the Bern model. Disk gas mass and metallicity are binned at their median values.

3 Conferences and Workshops

AbGradEPEC 2023

Astrobiology Graduates in Europe (AbGradE) & the Europlanet Early Career network (EPEC)

Hotel La Palma & Teneguia Princess, May 4-6, 2023

After 2 years of postponing it, AbGradE and EPEC are pleased to invite you to our joint symposium **AbGradEPEC 2023**!

The event will take place on the beautiful island of La Palma (Spain) at the Hotel La Palma & Teneguia Princess on May 4–6, 2023 (right before the BEACON conference)!

The symposium is open to all early-careers – from undergraduates to postdocs and professionals. It will be a great opportunity to get to know other astrobiolgists and planetary scientists! “AbGradEPEC 2023” will be a chance to show that the space research family is still vibrant and motivated despite pandemics, wars, and natural disasters.

For the scientific sessions on Thursday and Friday we welcome **contributed talks (and/or posters)** by our attendees. Depending on the final number of submitted abstracts, the length of the talks will be between 10 and 20 minutes. This is an opportunity to give your talk in front of peers in a stress-free environment. If you plan to present at both AbGradEPEC and BEACON, we kindly ask you to either contribute a presentation at AbGradEPEC for your BEACON poster, or chose two different topics, in case you contribute oral presentations for both events.

The deadline for abstract submission (and accommodation grant applications) is January 31st, 2023.

We are happy to announce that we will be able to offer some **accommodation grants**! To be eligible, you must submit an abstract and tick the respective field in the registration form (`https://forms.gle/TybueATPYEWiNBWb7`). The result of the grant evaluation will be announced in the third week of February to ensure that awardees are able to book their accommodation before the registration deadline (March 1st).

We very much hope that you will be able to join us in beautiful La Palma for AbGradEPEC 2023!

Download/Website: `https://abgrade.eu/abradepec2023/`

Contact: `abgrade@eana-net.eu`

PS10: Advances in Modeling the Formation, Atmospheric, and Geological Properties of Habitable Planets

(Nader Haghighipour, Arika Higuchi, Soko Matsumura)

Singapore, July 30 - August 4, 2023

Dear colleagues,

We cordially invite you to submit abstracts to the AOGS session PS10, Advances in Modeling the Formation, Atmospheric, and Geological Properties of Habitable Planets. The session will be held during the 20th AOGS Annual Meeting on July 30 - April 4 in Singapore.

During the past few years, major advances were made to model the formation, and explain the geological and atmospheric properties of potentially habitable planets. New theories have been developed and computational models have become deeply sophisticated. These advances have also paved the way for extending new ideas to the formation and characterization of other planetary systems. The session PS10 focuses on these topics through a combination of invited, contributed, and poster presentations. We welcome abstracts for oral and poster contributions in all areas related to theoretical, observational and experimental studies of the formation and characterization of habitable planets, and their geological and atmospheric properties, both in our solar system and extrasolar planets.

For more details and submitting abstracts, please see

https://www.asiaoceania.org/aogs2023/public.asp?page=submit_abstracts.asp

ABSTRACT DEADLINE: FEBRUARY 14, 2023

Looking forward to seeing you in Singapore

Convenors: Nader Haghighipour, Arika Higuchi, Soko Matsumura

Exoclimes VI

Nathan Mayne, Hannah Wakeford

University of Exeter (UK), 26-30 June 2023

Exoclimes is a conference series devoted to understanding the climate and climate evolution of exoplanets. It began in 2010 at the University of Exeter, UK.

ExoSLAM Summer School

Hugo Lambert, Denis Sergeev

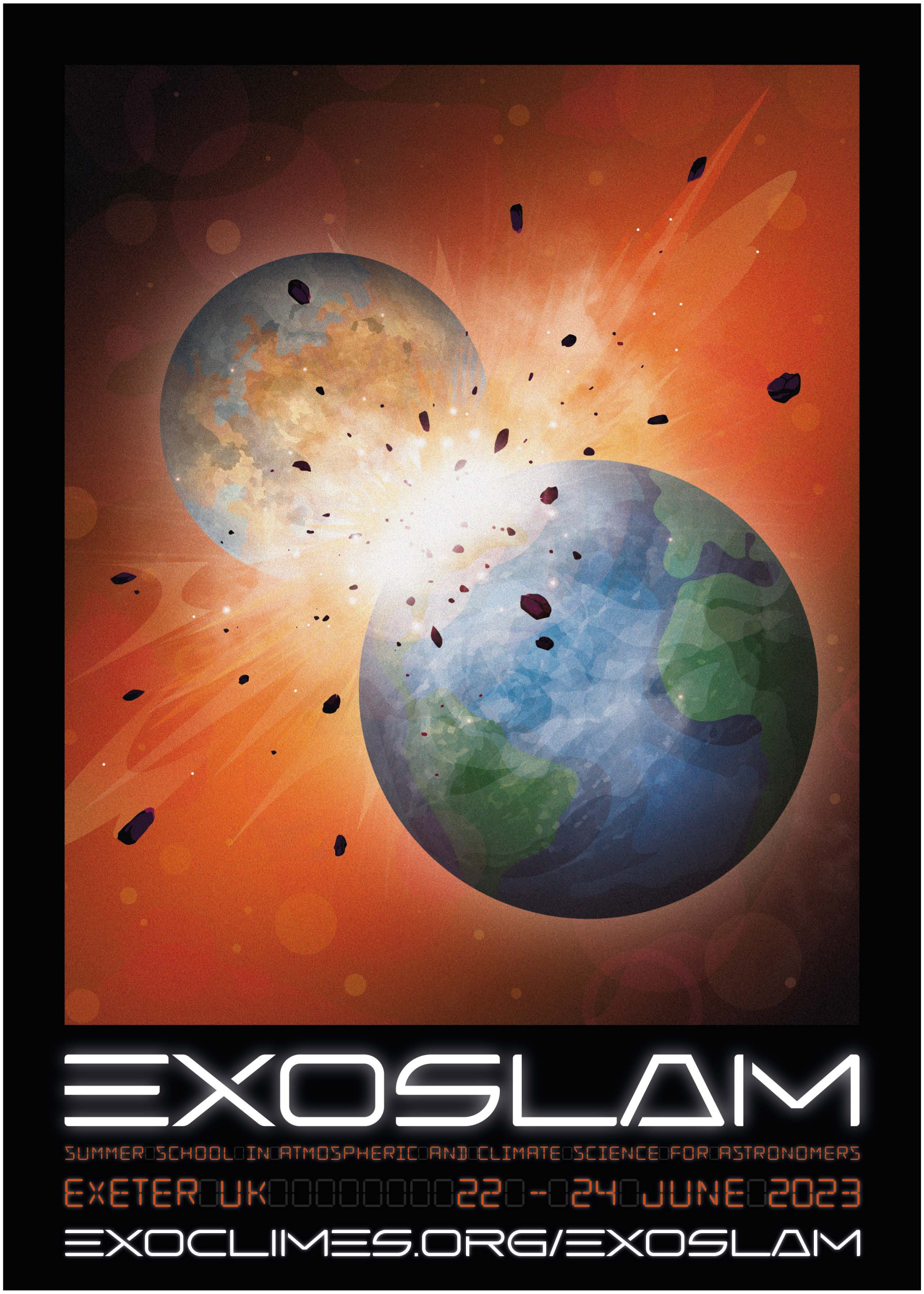
University of Exeter (UK), 22-24 June 2023

ExoSLAM will introduce attendees to the fundamental Earth and planetary science needed to understand the atmospheres and climates of recently discovered exoplanets. The course is aimed at PhD students and other early career researchers who are comfortable with degree-level physics and/or mathematics but want to learn how these concepts can be applied to understand the great variety of proposed exoplanetary atmospheres and climates. Taking place over three days, we will teach through a series of lectures, computer practicals and discussion. Our aim is to give attendees the opportunity not only to learn content but also to interact with instructors and each other, giving them the best chance of learning tools that support their own research.

Download/Website: `https://exoclimes.org`

Contact: `exoclimesvi@gmail.com`


EXETER
EXOCLIMES VI
come
explore the
diversity
of planetary
atmospheres
University of Exeter
26TH - 30TH JUNE 2023


EXOSLAM
SUMMER SCHOOL IN ATMOSPHERIC AND CLIMATE SCIENCE FOR ASTRONOMERS
EXETER UK 22 - 24 JUNE 2023
EXOCLIMES.ORG/EXOSLAM

Complex Planetary Systems II (CPSII) - Kavli-IAU Symposium 382

A. Lemaitre, A.-S. Libert
Namur Institute for Complex Systems naXys, University of Namur

Namur, Belgium, 3-7 July 2023

All the planetary systems, from the Earth-Moon system to the extrasolar ones, are complex systems, requiring several levels of expertise and interdisciplinarity to be clearly understood. Following the success of Complex Planetary Systems in 2014, CPSII aims to bring forward the latest findings obtained in that perspective and generate new collaborations between different disciplines for the future. Any astronomer involved in planetary systems, at any level, is invited to participate to the meeting and to propose its own expertise in future complex challenges. It will be a face-to-face meeting, with several thematic sessions, round tables, poster prices, and many opportunities to discuss emerging topics and meet young researchers.

KEY TOPICS
- Exoplanets, climate, and interiors
- Formation of planetary systems
- Long-term evolution and stability of planetary systems
- Small bodies dynamics
- Dynamics of resonances and observations
- Orbit propagation methods
- Rotation of planets and satellites
- Dynamics of space debris

IMPORTANT DATES
Deadline for IAU grant application: 15th January 2023
Deadline for abstract submission: 31st January 2023

SPEAKERS: Rose-Marie Baland, Konstantin Batygin, Giulio Baù, Emeline Bolmont, Alexandre Correia, Jean-Baptiste Delisle, Caroline Dorn, Daniel Fabrycky, Davide Farnocchia, Catalin Gales, Michaël Gillon, Mikael Granvik, Andres Johansen, Dong Lai, Man Hoi Lee, Alessandro Morbidelli, Antoine Petit, Cristobal Petrovich, Nicolas Rambaux, Aaron Rosengren, Daniel J. Scheeres, Kleomenis Tsiganis

SOC: Anne-Sophie Libert (chair), Anne Lemaitre (vice-chair), Cristian Beaugé, Slawomir Breiter, Alessandra Celletti, Shigeru Ida, Emmanuelle Javaux, Dong Lai, Jacques Laskar, Daniel J. Scheeres, Federica Spoto, Elke Pilat-Lohinger (Division A representative)

Download/Website: `https://cps2.unamur.be`
Contact: `cps2@unamur.be`

2023 Sagan Summer Hybrid Workshop
Characterizing Exoplanet Atmospheres: The Next Twenty Years

T. Chen, D. Gelino
NASA Exoplanet Science Institute, California Institute of Technology, Pasadena, CA, USA

Hybrid Workshop, July 24-28, 2023

Observations of an exoplanetÕs atmosphere provide the best hope for distinguishing the makeup of its outer layers, and the only hope for understanding the interplay between formation, natal composition, chemical and disequilibrium processes, and dynamics and circulation. The field is entering a revolution in our understanding of exoplanet atmospheres thanks to measurements from the ground, from space, and particularly from JWST, the superlative facility for exoplanet studies. In the longer term, such observations will also be essential for seeking signs of biosignature gasses in nearby exoplanets using future, next-generation observatories.

Workshop Topics include:

- Atomosphere Fundamentals
- Direct Imaging and Spectroscopy
- Transmission, Secondary Eclipses, and Phase Curves
- Interferometric Observations
- Star-Planet Interactions
- Lessons Learned from Brown Dwarfs and the Solar System
- Atmospheric Escape and Mass Loss
- Observations of Terrestrial Exoplanet Atmospheres
- Retrievals and Fitting models to Data
- JWST Transit Science and Imaging

The preliminary agenda, including confirmed speakers is available on the workshop website. This year's workshop will cover theoretical modeling, interpretation, and observations of exoplanets using a variety of telescopes, techniques, and hands-on exercises, presented by leading experts in the field. The hands-on sessions will address reducing and fitting JWST data and also give attendees experience with tools for modeling and retrieving exoplanet atmospheres.

We plan to hold the 2023 workshop as a hybrid with both in-person and on-line attendance. It is unclear at this time what, if any, public health restrictions will be in place in July 2023 due to COVID.

The Sagan Summer Workshops are aimed at advanced undergraduates, grad students, and postdocs, however all are welcome to attend. Attendees will also participate in hands-on tutorials and have the chance to meet in smaller groups with our speakers.

There is no registration fee for this workshop and registration will open in February 2023. Please contact us with any questions or to be added to the email list.

Download/Website: `http://nexsci.caltech.edu/workshop/2023`
Contact: `sagan_workshop@ipac.caltech.edu`

The 5th Workshop on Extremely Precise Radial Velocities

J. Burt, B. J. Fulton, SOC Co-Chairs

Conference, March 27-30, 2023

Registration and lodging information for The Fifth Workshop on Extremely Precise Radial Velocities (EPRV 5) is now available! The conference agenda is also available. The deadline to register at the early rate is February 17 and the hotel reservation deadline is February 9. This will be a hybrid conference with online attendance possible. Please check the conference website for complete information and email us at eprv5@lists.astro.caltech.edu if you have any questions.

EPRV 5 will provide an opportunity to discuss key technical and scientific issues after a gap of four years since the last comparable meeting. The conference will feature talks from all major instrument and data analysis teams, to ensure that the community is aware of what each independent node is working towards and what challenges they are facing. We will invite representatives from stellar physics and heliophysics to increase the knowledge transfer between our fields and to hopefully spark new, cross disciplinary collaborations. A primary objective of the meeting agenda will be to allow ample time for discussion both during and after talk sessions, so that participants can engage in the level of detailed conversation that has made previous iterations such a boon to the field.

Submissions for poster presentations will be accepted until February 17, 2023. If you have any questions, contact the conference co-chairs Jennifer Burt (jennifer.burt@jpl.nasa.gov) and BJ Fulton (bjfulton@ipac.caltech.edu) or email us at eprv5@lists.astro.caltech.edu

Download/Website: `https://conference.ipac.caltech.edu/eprv5/`

Contact: `eprv5@lists.astro.caltech.edu`

4^{th} Advanced School on Exoplanetary Science:
"Astrophysics of Transiting Exoplanets"

Katia Biazzo [1], *Valerio Bozza* [2], *Luigi Mancini* [3], *Alessandro Sozzetti* [4]
[1] INAF – Rome Astronomical Observatory, Via Frascati 33 – 00078 Monte Porzio Catone, Rome, Italy
[2] Department of Physics, University of Salerno, Via Giovanni Paolo II 132, 84084 – Fisciano (SA), Italy
[3] Department of Physics, University of Rome "Tor Vergata", Via della Ricerca Scientifica 1, 00133 – Rome, Italy
[4] INAF – Turin Astrophysical Observatory, via Osservatorio 20, 10025 – Pino Torinese, Italy

Vietri sul Mare (Salerno), Italy, from 22 to 26 May, 2023

Rationale:
The Advanced School on Exoplanetary Science - taking place close to the enchanting Amalfi Coast - is aimed at providing a comprehensive, state-of-the-art picture of the rich variety of relevant aspects of the fast-developing, highly interdisciplinary field of exoplanet research (both from an observational and theoretical viewpoint). The School is addressed to graduate students and young post-doctoral researchers, and offers the fascinating possibility to interact with world-class experts engaged in different areas of the astrophysics of planetary systems. The 4^{th} edition of the School will be focused on the *Astrophysics of Transiting Exoplanet Systems*, covering both the theoretical and observational perspectives. In particular, the following kew questions will be addressed:

- the history and frontier of transiting exoplanets demographics (methodology and results), as a means for improved understanding of their formation and evolution;
- successes as well as astrophysical and methodological challenges in the determination of accurate and precise transiting exoplanet masses and radii;
- multi-transiting systems as tools for improving our knowledege of the origin and evolution of close-in, compact, high-multiplicity planetary systems;
- theoretical mechanisms and observations of atmospheric escape from highly irradiated transiting planets, as probes of their physical evolution;
- atmospheric characterization of transiting exoplanets (via transmission and emission spectroscopy), in the wake of the first results from the James Webb Space Telescope.

Organizing Committee:
K. Biazzo (INAF - Rome Astronomical Observatory), V. Bozza (University of Salerno), L. Mancini (University of Rome "Tor Vergata"), A. Sozzetti (INAF - Turin Astrophysical Observatory)

Confirmed School Lecturers:
Statistics of Transiting Exoplanets: Prof. Courtney Dressing, University of California at Berkeley, USA
Accurate radii and masses: Dr. Aldo Bonomo, INAF – Turin Astrophysical Observatory, Italy
Multitransiting systems: Prof. Eric Ford, Pennsylvania State University, USA
Transiting exoplanet atmospheres: Prof. Laura Kreidberg, Max Planck Institute for Astronomy, Germany
Atmospheric escape: Dr. James Owen, Imperial College London, UK

Fee:
The registration fee is 350 Euro and includes a conference kit, coffee breaks, social dinner and full access to the video recordings of the lectures. A limited number of grants, covering the registration fee, will be available for selected participants. Justified requests for economic support (addressed via email to the Organizing Committee) will have to be accompanied by the submission of a Curriculum Vitae (deadline: March 15, 2023).

Registration, abstract submission:
Registration is now open and close on 1 April, 2023. There is a limited number of time slots for brief seminars

of participants to present their own research. Title/Abstract submission is possible at any later moment after registration by sending an email to the Organizing Committee (deadline: April 15, 2023). All participants are allowed and encouraged to bring a poster.

Important Dates:
$9^{\rm th}$ January 2023: First Announcement, Registration opens
$1^{\rm st}$ March 2023: Second and Final Announcement
$15^{\rm th}$ March 2023: Accommodation Subsidy Deadline
$3^{\rm rd}$ April 2023: Registration Deadline
$15^{\rm th}$ April 2023: Oral contribution Deadline
$1^{\rm st}$ May 2023: Final School programme
$22^{\rm nd} - 26^{\rm th}$ May 2023: The School

Download/Website: `https://ases4.web.roma2.infn.it/`

Contact: `lmancini@roma2.infn.it - facebook.com/ases2023 - twitter.com/ases2023 - #ases4`

4 Exoplanet Archives

November 2022 Updates at the NASA Exoplanet Archive

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

Pasadena CA USA, December 13, 2022

Note: Unless otherwise noted, all planetary and stellar data mentioned in the news are in the Planetary Systems Table (`https://bit.ly/PlanetarySystems`), which provides a single location for all self-consistent planetary solutions, and its companion table the Planetary Systems Composite Parameters (`https://bit.ly/PSCompPars`), which offers a more complete table of parameters combined from multiple references and calculations. Data may also be found in the Microlensing Planets Table (`https://bit.ly/newMicrolensing`) and the Direct Imaging Planets Table (`https://bit.ly/DirectImagingTable`).

November 17, 2022

Five New Planets, Including MORE Hot Jupiters

Three of this week's new planets are hot Jupiters discovered by the Next-Generation Transit Survey (NGTS) (`https://ngtransits.org/`), which may help us better understand the physical processes driving radius inflation observed in many hot Jupiters. We've also added new parameters for HATS-54 b (a.k.a. NGTS-22 b), another hot Jupiter studied by NGTS.

The new planets are NGTS-23 b, NGTS-24 b, NGTS-25 b, HD 191939 g, and HD 20329 b. Also, we've added new parameters for all seven TRAPPIST-1 planets from Ducrot et al. 2020 (`http://bit.ly/3PoPDnU`).

November 11, 2022

Small Planets For the Win This Week

This week's nine new planets range in size from sub-Earth to sub-Neptune—with the smallest being a sub-Earth with a planet radius of only 0.76!

The new planets are K2-411 b, K2-412 b, K2-413 b & c, K2-414 b & c, HD 18599 b, and TOI-1468 b & c.

We've also added new parameter sets for five planets, including TOI-1075 b, which was featured in a recent NASA Discovery Alert (`https://go.nasa.gov/3FgRgPI`).

November 3, 2022

Eight Planets, Including Two in the Hot, Sub-Saturn Desert

This week's new planets include two TESS discoveries, TOI-969 b and TOI-3884 b, that are rare for their type: short-period planets between the sizes of sub-Neptunes and Saturn.

Six other planets added this week are TOI-969 c, OGLE-2017-BLG-1691L b, KMT-2021-BLG-0320L b, KMT-2021-BLG-1303L b, KMT-2021-BLG-1554L b, and HD 206893 b.

We've also demoted 2MASS J21402931+1625183 A b to False Positive Planet status based on a published refutation (`http://bit.ly/3HqWfjy`). Its disposition has been updated on its System Overview page (`http://bit.ly/3iMiLce`), which will continue to serve its data.

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

Contact: `mharbut@caltech.edu`

December 2022 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, January 10, 2023

Note: Unless otherwise noted, all planetary and stellar data mentioned in the news are in the Planetary Systems Table (`https://bit.ly/PlanetarySystems`), which provides a single location for all self-consistent planetary solutions, and its companion table the Planetary Systems Composite Parameters (`https://bit.ly/PSCompPars`), which offers a more complete table of parameters combined from multiple references and calculations. Data may also be found in the Microlensing Planets Table (`https://bit.ly/newMicrolensing`) and the Direct Imaging Planets Table (`https://bit.ly/DirectImagingTable`).

December 22, 2022

Eight New Planets, Including Two Potentially Habitable exo-Earths

For our final update of 2022, we've added eight new planets that include two Earth-like planets located only 16 light-years away. GJ 1002 b & c orbit a cool, faint red dwarf star and were discovered with the ESPRESSO and CARMENES planet-hunting spectrographs. For further details, read the media release (`https://bit.ly/3FMsYNP`) and discovery paper by Suárez Mascareño et al. (2022). (`https://bit.ly/3VjKoXG`)

The other planets added this week are KMT-2017-BLG-0673L b, KMT-2019-BLG-0414L b, KMT-2021-BLG-0240L b, TOI-1260 d, and HD 109833 b & c. As always, the new stellar and planetary data can be found in the Planetary Systems Table and its companion table, Planetary Systems Composite Parameters.

See You in 2023!

The NASA Exoplanet Archive staff will be enjoying a winter break from Dec. 24 through Jan. 2, during which there will be no data or software updates. Responses to Helpdesk requests and social media may be delayed.

If you're attending the 241st Meeting of the American Astronomical Society (AAS) in Seattle next month, stop by booth 608 in the Exhibit Hall and say hello!

We wish everyone a safe and cozy holiday season and another banner year for exoplanet research!

December 8, 2022

Six Super-Earths In a Pristine Resonant Chain

We've added seven new planets, six of them orbiting TOI-1136 in a chain of mean-motion resonances (MMR). This result further supports the convergent disk migration theory for planets that have formed with MMR chains.

Read the discovery paper by Dai et al. (2022) (`https://bit.ly/3WlrJfs`) and check out the TOI-1136 System Overview page (`https://bit.ly/3PPA7kZ`).

A seventh new planet, HD 206893 c, was also added, as well as new parameter sets for HAT-P-18 b, HIP 41378 d, HIP 21152 b, and HD 45364 b & c. We have also dispositioned alpha Cen B b to False Positive Planet status. Its data are now viewable on the alf Cen B System Overview page (`https://bit.ly/3VlJeLg`).

December 2, 2022

Nine Planets and New JWST Spectrum

We've added nine planets and a new WASP-39 b spectrum captured by NASA's James Webb Space Telescope (JWST).

This week's new planets are TOI-1695 b, HD 167768 b, MOA-2019-BLG-008L b, TOI-277 b, TOI-1288 b, KMT-2021-BLG-0119L b, KMT-2021-BLG-0192L b, KMT-2021-BLG-2294L b, and HD 114082 b.

Access the new WASP-39 b spectrum—as well as previously published spectra for this object——in the Transmission Spectroscopy table (`https://bit.ly/2B54JfR`). The new spectrum was captured by JWST's NIRCam instrument, thus extending the wavelength coverage for further atmospheric studies of the hot Jupiter. This Nature article discusses JWST's science results for WASP-39 b (`https://bit.ly/3Wl0ySa`).

Also, HD 73256 b, which was previously removed based on a published refutation, has been dispositioned as a False Positive Planet (FPP). Its data are now viewable on the HD 73256 System Overview page (`https://bit.ly/3FQNblG`).

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

Contact: `mharbut@caltech.edu`

5 As seen on astro-ph

The following list contains exoplanet related entries appearing on astro-ph in December 2022.
Disclaimer: The hyperlinks to the astro-ph articles are provided for the convenience of the reader, but the ExoPlanet News cannot be responsible for their accuracy and perpetuity.

December 2022

astro-ph/2212.00034: **Direct Imaging and Astrometric Discovery of a Superjovian Planet Orbiting an Accelerating Star** *by Thayne Currie et al.*
astro-ph/2212.00514: **Modeling the CO outflow in DG Tau B: Swept-up shells versus perturbed MHD disk wind** *by A. de Valon et al.*
astro-ph/2212.00599: **Measuring the Dust Masses of Protoplanetary Disks in Lupus with ALMA: Evidence that Disks can be Optically Thick at 3 mm** *by Z. Xin et al.*
astro-ph/2212.00783: **Collision detection for N-body Kepler systems** *by P. M. Visser*
astro-ph/2212.00807: **Binary formation through gas-assisted capture and the implications for stellar, planetary and compact-object evolution** *by Mor Rozner et al.*
astro-ph/2212.00853: **Dust Rings and Cavities in the Protoplanetary Disks around HD 163296 and DoAr 44** *by Harrison Leiendecker et al.*
astro-ph/2212.00198: **Collinear and triangular solutions to the three-body problem in the parameterized post-Newtonian formalism** *by Yuya Nakamura, Hideki Asada*
astro-ph/2212.01291: **Constraining the turbulence and the dust disk in IM Lup: onset of planetesimal formation** *by Riccardo Franceschi et al.*
astro-ph/2212.01023: **Formation of pebbles in (gravito-)viscous protoplanetary disks with various turbulent strengths** *by Eduard I. Vorobyov et al.*
astro-ph/2212.01000: **A Dynamical Systems Analysis of the Effects of the Launch Rate Distribution on the Stability of a Source-Sink Orbital Debris Model** *by Celina Pasiecznik et al.*
astro-ph/2212.00993: **Observed Rate Variation in Superflaring G-type Stars** *by James Crowley et al.*
astro-ph/2212.02644: **The runaway greenhouse on subNeptune waterworlds** *by Raymond T. Pierrehumbert*
astro-ph/2212.02633: **Topological Designs for Scalar Vortex Coronagraphs** *by Niyati Desai et al.*
astro-ph/2212.02542: **The Orbital Architecture of Qatar-6: A Fully Aligned 3-Body System?** *by Malena Rice et al.*
astro-ph/2212.02526: **Gravoturbulence in local disk simulations with an adaptive moving mesh** *by Oliver Zier, Volker Springel*
astro-ph/2212.02502: **Improved radius determinations for the transiting brown dwarf population in the era of Gaia and TESS** *by Theron W. Carmichael*
astro-ph/2212.02492: **Giant Planet Observations in NASA's Planetary Data System** *by Nancy J. Chanover et al.*
astro-ph/2212.02311: **Boundary Layers of Circumplanetary Disks around Spinning Planets I. Effects of Rossby Waves** *by Zhihao Fu et al.*
astro-ph/2212.02200: **Detection of separatrices and chaotic seas based on orbit amplitudes** *by Jerome Daquin, Carolina Charalambous*
astro-ph/2212.02070: **Evolution of the Angular Momentum of Molecular Cloud Cores Formed from Filament Fragmentation** *by Yoshiaki Misugi et al.*
astro-ph/2212.03266: **TESS Hunt for Young and Maturing Exoplanets (THYME) IX: a 27 Myr extended population of Lower-Centaurus Crux with a transiting two-planet system** *by Mackenna L. Wood et al.*
astro-ph/2212.03264: **Detection of the brown dwarf donor in the period-bouncer BW Sculptoris** *by Vitaly Neustroev, Iikka Mäntynen*
astro-ph/2212.03207: **Resolved near-UV hydrogen emission lines at 40-Myr super-Jovian protoplanet Delorme 1 (AB)b: Indications of magnetospheric accretion** *by Simon C. Ringqvist et al.*

astro-ph/2212.03240: **A Lack of Variability Between Repeated Spitzer Phase Curves of WASP-43b** *by Matthew M. Murphy et al.*
astro-ph/2212.03062: **Emergence of vortices at the edges of planet-driven gaps in protoplanetary discs** *by Nicolas P. Cimerman, Roman R. Rafikov*
astro-ph/2212.02903: **Newly identified compact hierarchical triple system candidates using Gaia DR3** *by Donát R. Czavalinga et al.*
astro-ph/2212.02832: **Convection and Clouds under Different Planetary Gravities Simulated by a Small-domain Cloud-resolving Model** *by Jiachen Liu et al.*
astro-ph/2212.02743: **Two saturated states of the vertical shear instability in protoplanetary disks with vertically varying cooling times** *by Yuya Fukuhara et al.*
astro-ph/2212.03007: **Observing Circumplanetary Disks with METIS** *by Nickolas Oberg et al.*
astro-ph/2212.03991: **Center-to-limb variation of spectral lines and continua observed with SST/CRISP and SST/CHROMIS** *by A. G. M. Pietrow et al.*
astro-ph/2212.03953: **Measured Spin-Orbit Alignment of Ultra-Short Period Super-Earth 55 Cancri e** *by Lily L. Zhao et al.*
astro-ph/2212.03934: **The Nominal Range of Rocky Planet Masses, Radii, Surface Gravities and Bulk Densities** *by Cayman T. Unterborn et al.*
astro-ph/2212.03872: **On the Application of Bayesian Leave-One-Out Cross-Validation to Exoplanet Atmospheric Analysis** *by Luis Welbanks et al.*
astro-ph/2212.03852: **The Effects of Early Collisional Evolution on Amorphous Water Ice Bodies** *by Jordan K. Steckloff et al.*
astro-ph/2212.03757: **Search for planets around stars with wide brown dwarfs** *by J. Šubjak et al.*
astro-ph/2212.03702: **Liquid Water on Cold Exo-Earths via Basal Melting of Ice Sheets** *by Lujendra Ojha et al.*
astro-ph/2212.03686: **Optical and Opto-mechanical Analysis and Design of the Telescope for the Ariel Mission** *by Paolo Chioetto*
astro-ph/2212.03608: **A recipe for orbital eccentricity damping in the type-I regime for low viscosity 2D-discs** *by Gabriele Pichierri et al.*
astro-ph/2212.03514: **The CARMENES search for exoplanets around M dwarfs. Variability on long timescales as seen in chromospheric indicators** *by B. Fuhrmeister et al.*
astro-ph/2212.03833: **The effect of interior heat flux on the atmospheric circulation of hot and ultra-hot Jupiters** *by Thaddeus D. Komacek et al.*
astro-ph/2212.04557: **Assessing the C/O Ratio Formation Diagnostic: A Potential Trend with Companion Mass** *by Kielan K. W. Hoch et al.*
astro-ph/2212.04509: **Comets and Planetesimal Formation** *by Jacob B. Simon et al.*
astro-ph/2212.05929: **Milankovitch equations with spinors** *by Barnabás Deme, Jean-Baptiste Fouvry*
astro-ph/2212.04290: **Making the Solar System** *by John Chambers*
astro-ph/2212.04243: **Photon Flux Perturbations of Kepler Light Curves** *by Antonio Paris*
astro-ph/2212.04236: **Heavy-element Accretion by Proto-Jupiter in a Massive Planetesimal Disk, Revisited** *by Sho Shibata et al.*
astro-ph/2212.04307: **Discovery of TOI-1260d and the characterisation of the multi-planet system** *by Kristine W. F. Lam et al.*
astro-ph/2212.04986: **The role of the drag force in the gravitational stability of dusty planet forming disc – I. Analytical theory** *by Cristiano Longarini et al.*
astro-ph/2212.05016: **Orbits of the TOI-1338 and TIC-172900988 systems** *by Dionysios Gakis, Konstantinos N. Gourgouliatos*
astro-ph/2212.05052: **GCM Constraints on the Detectability of the CO_2-CH_4 Biosignature Pair on TRAPPIST-1e with JWST** *by Yoav Rotman et al.*
astro-ph/2212.05114: **Repeated Cyclogenesis on Hot-Exoplanet Atmospheres with Deep Heating** *by J. W. Skin-*

ner et al.

astro-ph/2212.05137: **A Green Bank Telescope search for narrowband technosignatures between 1.1-1.9 GHz during 12 Kepler planetary transits** *by Sofia Z. Sheikh et al.*

astro-ph/2212.05539: **UV-driven Chemistry as a Signpost for Late-stage Planet Formation** *by Jenny K. Calahan et al.*

astro-ph/2212.05981: **On the presence of metallofullerenes in fullerene-rich circumstellar envelopes** *by R. Barzaga et al.*

astro-ph/2212.06161: **Common envelope evolution and triple dynamics as potential pathways to form the inner white dwarf + brown dwarf binary of the triple star system Gaia 0007-1605** *by F. Lagos et al.*

astro-ph/2212.06185: **Terminator Habitability: the Case for Limited Water Availability on M-dwarf Planets** *by Ana H. Lobo et al.*

astro-ph/2212.06192: **Impact of MgII interstellar medium absorption on near-ultraviolet exoplanet transit measurements** *by A. G. Sreejith et al.*

astro-ph/2212.06266: **NEID Reveals that The Young Warm Neptune TOI-2076 b Has a Low Obliquity** *by Robert C. Frazier et al.*

astro-ph/2212.06912: **Cold Deuterium Fractionation in the Nearest Planet-Forming Disk** *by Carlos E. Muñoz-Romero et al.*

astro-ph/2212.06791: **X-Shooter Survey of Young Intermediate Mass Stars – I. Stellar Characterization and Disc Evolution** *by Daniela P. Iglesias et al.*

astro-ph/2212.06671: **Time transfer functions without enhanced terms in stationary spacetime – Application to an isolated, axisymmetric spinning body** *by P. Teyssandier*

astro-ph/2212.07546: **Statistical Analysis of the Dearth of Super-eccentric Jupiters in the Kepler Sample** *by Jonathan M. Jackson et al.*

astro-ph/2212.08477: **Evidence for the volatile-rich composition of a 1.5-$R_\oplus$ planet** *by Caroline Piaulet et al.*

astro-ph/2212.07450: **Transit Depth Variations Reveal TOI-216 b to be a Super-Puff** *by Brendan J. McKee, Benjamin T. Montet*

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astro-ph/2212.07332: **Two temperate Earth-mass planets orbiting the nearby star GJ1002** *by A. Suárez Mascareño et al.*

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astro-ph/2212.08047: **MINDS. The detection of $^{13}CO_2$ with JWST-MIRI indicates abundant CO_2 in a protoplanetary disk** *by Sierra L. Grant et al.*

astro-ph/2212.07966: **TrExoLiSTS: Transiting Exoplanets List of Space Telescope Spectroscopy** *by Nikolay K. Nikolov et al.*

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Nelson et al.
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astro-ph/2212.08436: **Dust hot spots at 10 au scales around the Class 0 binary IRAS 16293-2422 A: a departure from the passive irradiation model** *by M. J. Maureira et al.*
astro-ph/2212.08667: **Mapping Protoplanetary Disk Vertical Structure with CO Isotopologue Line Emission** *by Charles J. Law et al.*
astro-ph/2212.08695: **Kepler-80 Revisited: Assessing the Participation of a Newly Discovered Planet in the Resonant Chain** *by Drew Weisserman et al.*
astro-ph/2212.08696: **Constraints on Stellar Flare Energy Ratios in the NUV and Optical From a Multiwavelength Study of GALEX and Kepler Flare Stars** *by C. E. Brasseur et al.*
astro-ph/2212.08741: **Taylor-Couette flow for astrophysical purposes** *by H. Ji, J. Goodman*
astro-ph/2212.08812: **Orbital structure of planetary systems formed by giant impacts: stellar mass dependence** *by Haruka Hoshino, Eiichiro Kokubo*
astro-ph/2212.09117: **Limb darkening measurements from TESS and Kepler light curves of transiting exoplanets** *by P. F. L. Maxted*
astro-ph/2212.09401: **Direct driving of simulated planetary jets by upscale energy transfer** *by Vincent G. A. Böning et al.*
astro-ph/2212.09526: **Hubble WFC3 Spectroscopy of the Terrestrial Planets L98-59 c & d: No Evidence for a Clear Hydrogen Dominated Primary Atmosphere** *by Li Zhou et al.*
astro-ph/2212.09590: **Ultra-Low-Frequency Radio Astronomy Observations from a Selenocentric Orbit: first results of the Longjiang-2 experiment** *by Jingye Yan et al.*
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astro-ph/2212.09752: **The Possible Tidal Demise of Kepler's First Planetary System** *by Shreyas Vissapragada et al.*
astro-ph/2212.10639: **Hydrodynamic turbulence in disks with embedded planets** *by Alexandros Ziampras et al.*
astro-ph/2212.09958: **Analytic frozen and other low eccentric orbits under J2 perturbation** *by David Arnas*
astro-ph/2212.10569: **The phase-space architecture in extrasolar systems with two planets in orbits of high mutual inclination** *by Rita Mastroianni, Christos Efthymiopoulos*
astro-ph/2212.10796: **Collisional Growth and Fragmentation of Dust Aggregates. II. Mass Distribution of Icy Fragments** *by Yukihiko Hasegawa et al.*
astro-ph/2212.10922: **Occurrence rate of hot Jupiters orbiting red giant stars** *by Milou Temmink, Ignas A. G. Snellen*
astro-ph/2212.11919: **Populations of the Kreutz Sungrazer System in a SOHO Database** *by Zdenek Sekanina*
astro-ph/2212.11421: **PACMAN: A pipeline to reduce and analyze Hubble Wide Field Camera 3 IR Grism data** *by Sebastian Zieba, Laura Kreidberg*
astro-ph/2212.11816: **High-Resolution Transmission Spectroscopy of the Terrestrial Exoplanet GJ 486b** *by Andrew Ridden-Harper et al.*
astro-ph/2212.11458: **Analytic frozen orbits under the zonal harmonics perturbation from an Earth-like planet** *by David Arnas*

astro-ph/2212.12543: **The contribution of the modern amateur astronomer to the science of astronomy** *by Filipp Romanov*

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astro-ph/2212.13019: **OGLE-2018-BLG-0584 and KMT-2018-BLG-2119: two microlensing events with two lens masses and two source stars** *by Cheongho Han et al.*

astro-ph/2212.13174: **Dust from collisions: A way to probe the composition of exo-planets?** *by A. Morlok et al.*

astro-ph/2212.14097: **A 3-Dimension Model of Volcanism Volatiles Contribution on Atmospheric Chemical Abundance of Habitable Planets** *by Zihan Huang, Xing Zhou Q*

astro-ph/2212.14022: **Relation between metallicities and spectral energy distributions of Herbig Ae/Be stars. A potential link with planet formation** *by J. Guzman-Diaz et al.*

astro-ph/2212.14248: **Mid-infrared spectra of the shocked Murchison CM chondrite: Comparison with astronomical observations of dust in debris disks** *by A. Morlok et al.*

astro-ph/2212.14529: **The physical and chemical processes in protoplanetary disks: constraints on the composition of comets** *by Yuri Aikawa et al.*