ExoPlanet News
An Electronic Newsletter

No. 187, 14 January 2025

Editors: L. Schlarmann, D. Angerhausen, J. Davoult, H. Wang & T.-E. Riesen
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1 Editorial

Welcome to Edition 187 of the ExoPlanet News!

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!

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 (v2.0) for submitting contributions, as well as all previous editions of ExoPlanet News, can be found on the ExoPlanet News webpage (`https://nccr-planets.ch/exoplanetnews/`).

The next issue will appear on February 11th 2025.

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

Leander Schlarmann
Daniel Angerhausen
Jeanne Davoult
Haiyang Wang
Timm-Emanuel Riesen

2 Abstracts of refereed papers

Earth-like exoplanets in spin-orbit resonances: climate dynamics, 3D atmospheric chemistry, and observational signatures

M. Braam[1,2,3,4], *P. I. Palmer*[1,2], *L. Decin*[3], *N.J. Mayne*[5], *J. Manners*[6], *S. Rugheimer*[7]

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[5] Department of Physics and Astronomy, Faculty of Environment Science and Economy, University of Exeter, Exeter EX4 4QL, UK
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The Planetary Science Journal, published (10.3847/PSJ/ad9565)

Terrestrial exoplanets around M- and K-type stars are important targets for atmospheric characterisation. Such planets are likely tidally locked with the order of spin-orbit resonances (SORs) depending on eccentricity. We explore the impact of SORs on 3D atmospheric dynamics and chemistry, employing a 3D coupled Climate-Chemistry Model to simulate Proxima Centauri b in 1:1 and 3:2 SOR. For a 1:1 SOR, Proxima Centauri b is in the Rhines rotator circulation regime with dominant zonal gradients (global mean surface temperature 229 K). An eccentric 3:2 SOR warms Proxima Centauri b to 262 K with gradients in the meridional direction. We show how a complex interplay between stellar radiation, orbit, atmospheric circulation, and (photo)chemistry determines the 3D ozone distribution. Spatial variations in ozone column densities align with the temperature distribution and are driven by stratospheric circulation mechanisms. Proxima Centauri b in a 3:2 SOR demonstrates additional atmospheric variability, including daytime-nighttime cycles in water vapour of $+55\%$ to -34% and ozone ($\pm 5.2\%$) column densities and periastron-apoastron water vapour cycles of $+17\%$ to -10%. Synthetic emission spectra for the spectral range of the Large Interferometer For Exoplanets fluctuate by up to 36 ppm with orbital phase angle for a 1:1 SOR due to 3D spatial and temporal asymmetries. The homogeneous atmosphere for the 3:2 SOR results in relatively constant emission spectra and provides an observational discriminant from the 1:1 SOR. Our work emphasizes the importance of understanding the 3D nature of exoplanet atmospheres and associated spectral variations to determine habitability and interpret atmospheric spectra.

Download/Website: `https://iopscience.iop.org/article/10.3847/PSJ/ad9565`
Contact: `marrick.braam@unibe.ch`

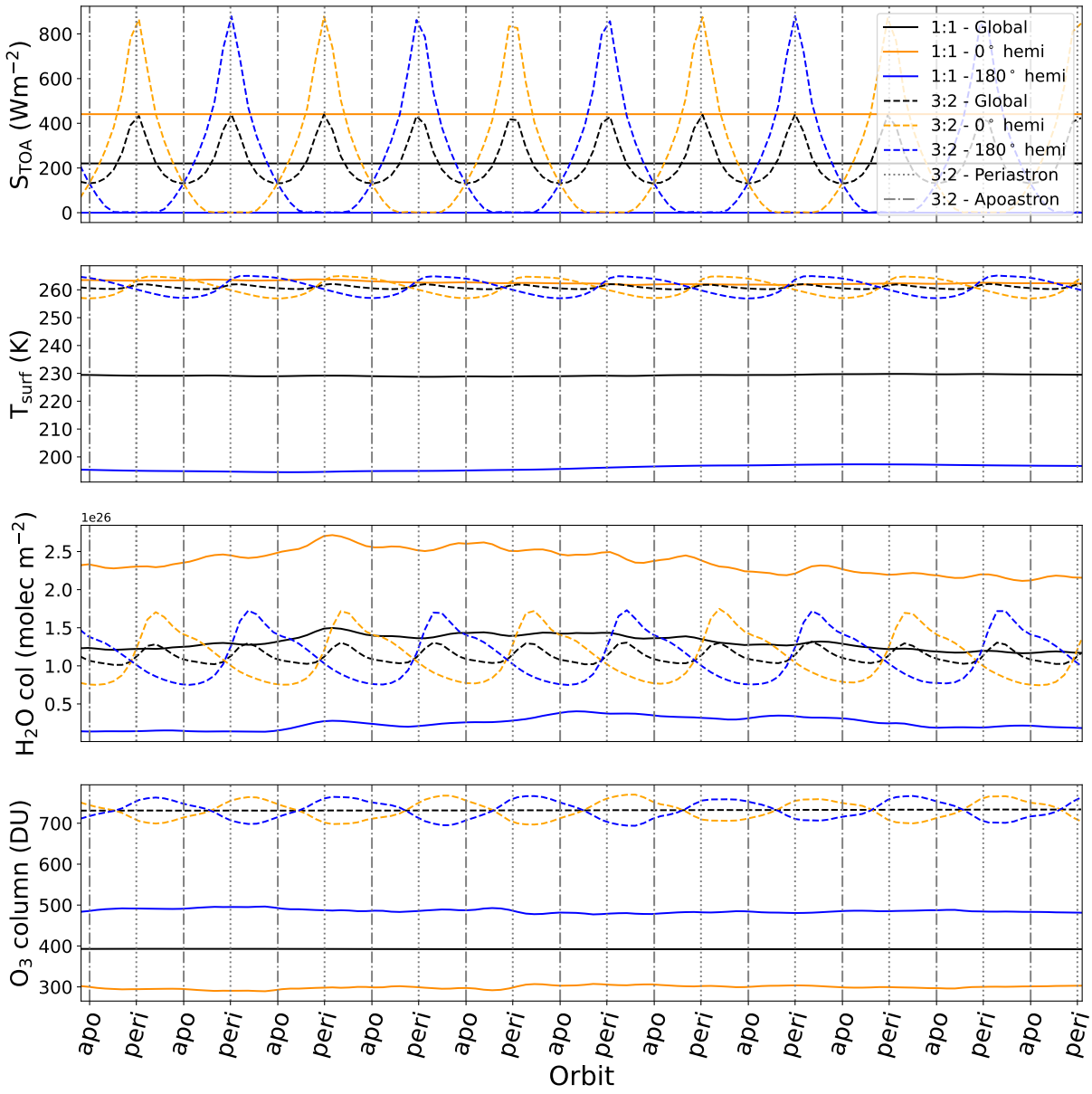

Figure 1: Temporal evolution of incoming stellar radiation at the top of the atmosphere (S_{TOA}, panel a), surface temperature (b), and vertically integrated water vapour (c) and ozone column densities (d) on Proxima Centauri b in a 1:1 SOR (solid lines) and a 3:2 SOR (dashed lines) over 120 days, corresponding to almost 11 orbits. Orange and blue lines indicate the 0° and 180° hemispheres, respectively. The global average values are shown as the black line. From the peaks in S_{TOA}, we identify the periastron and apoastron passages for the 3:2 SOR, denoted as the dotted and dashdotted grey vertical lines and specified on the x-axis. The separation between two successive periastron or apoastron passages represent an orbital period for Proxima Centauri b, independent of the exact SOR.

Gaussian process regression of temperature-dependent radial velocities

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[2] Department of Astrophysics, University of Exeter, Stocker Rd, Exeter EX4 4QL, UK
[3] Observatoire Astronomique de l'Université de Geneéve, Chemin Pegasi 51, 1290 Versoix, Switzerland

Monthly Notices of the Royal Astronomical Society, in press (arXiv:2501.02959)

Gaussian processes (GPs) described by quasi-periodic covariance functions have in recent years become a widely used tool to model the impact of stellar activity on radial velocity (RV) measurements.We perform a GP regression analysis on solar RV time series measured from spectral segments formed at different temperatures within the photosphere in order to evaluate the relation between the best-fit GP kernel hyperparameters and the observed activity signal as a function of temperature. The posterior distributions of the hyperparameters show subtle differences between high- and low-activity phases and as a function of the spectral formation temperature range, which could have implications on the characteristics of the activity signal and its optimal modelling. For the temperature-dependent RVs, we find that at high and low activity alike, the minimal RV dispersion is obtained at intermediately cool temperature ranges (4000 - 4750 K), for both the observed and GP model-subtracted RVs. Finally, we compare and correlate our temperature-dependent RVs with RV components derived from disk-resolved Dopplergrams of the Sun, for which we find a consistently strong correlation between RVs related to hotter temperature ranges and the dominant RV component due to the inhibition of convection.

Download/Website: `https://arxiv.org/pdf/2501.02959`

Contact: `f.rescigno@bham.ac.uk`

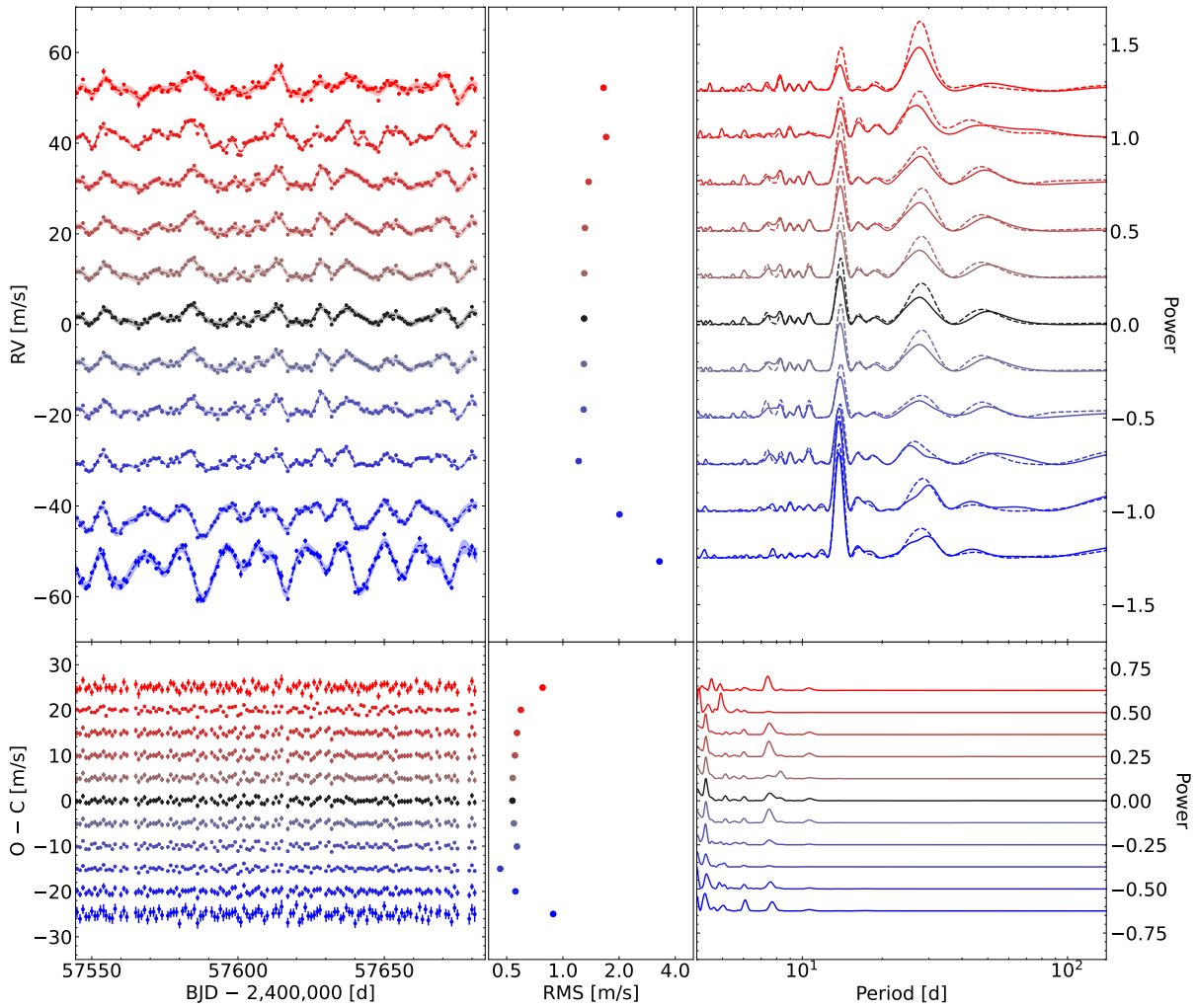

Figure 2: GP regression of the high-activity time interval. *Top left panel*: RV time series at different formation temperature ranges. The curve colours represent the same average formation temperatures as in Fig. 1 Observations are shown as points with errorbars, and the best-fit GP models are shown as dashed lines with shaded 1σ-intervals. *Top centre panel*: RV RMS for the data in the top left panel. Note the logarithmic x-axis. *Top right panel*: GLS periodograms of the observations (solid lines) and GPs (dashed lines) from the top left panel. *Bottom panels*: Same as top panels but for the RV residuals obtained by subtracting the GP models from the observations.

On the heating, excitation, dissociation and ionization of molecules by high-energy photons in planetary atmospheres

A. García Muñoz[1], *E. Bataille*[1]

[1] Université Paris-Saclay, Université Paris Cité, CEA, CNRS, AIM, 91191, Gif-sur-Yvette, France

ACS Earth and Space Chemistry, vol. 8, issue 12, pp. 2652-2663, December 2024, https://doi.org/10.1021/acsearthspacechem.4c00273

Photoionization by high-energy photons creates non-thermal electrons with a broad range of energies that heat and chemically transform the atmospheres of planets. The specifics of the interactions are notably different when the gas is atomic or molecular. Motivated by the idea that molecules survive to high altitude in some exoplanets, we built a model for the energy transfer from non-thermal electrons to the H_2O, H_2 and O_2 molecules. Our calculations show that the primary electrons of energy above about a hundred eV, a likely outcome from X-ray photoionization at moderately high atmospheric densities, expend most of their energy in ionization, dissociation and electronic excitation collisions. In contrast, the primary electrons of less than about ten eV, such as those produced by extreme-ultraviolet photons at low densities, expend most of their energy in momentum transfer (heating), rotational and vibrational excitation collisions. The partitioning between channels of weak thresholds is particularly sensitive to the local fractional ionization. The transition between these two situations introduces a parallel transition in the way the stellar energy is deposited in the atmosphere. Our calculations show that the non-thermal electrons enhance the ionization rate by a factor of a few or more with respect to photoionization alone, but may not greatly contribute to the direct dissociation of molecules unless the local flux of far-ultraviolet photons is relatively weak. These findings highlight the importance of tracking the energy from the incident photons to the non-thermal electrons and on to the gas for problems concerned with the remote sensing and energy balance of exoplanet atmospheres.

Download/Website: `https://pubs.acs.org/articlesonrequest/AOR-G3CXX2NGB4SM7MI2TWSA`

Contact: `antonio.garciamunoz@cea.fr`

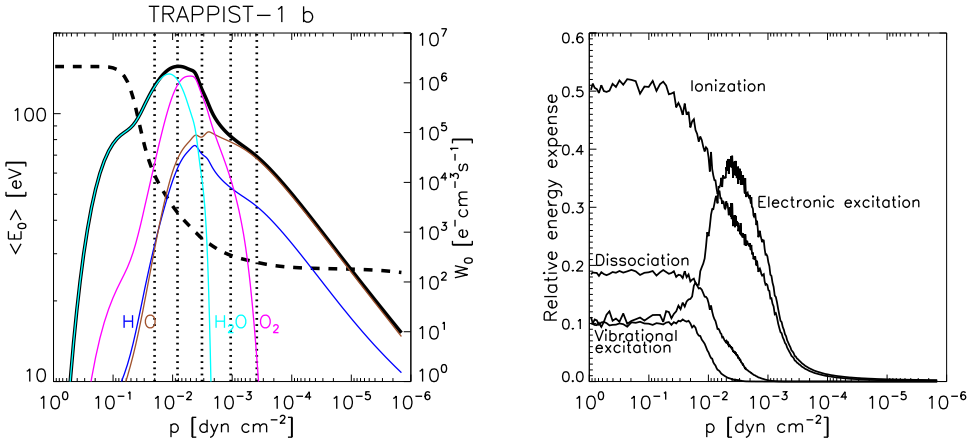

Figure 3: Left panel. Characteristic energy $<E_0>$ (left axis, dashed line) and production rate of primary electrons (right axis, solid lines) in the Trappist-1 b atmosphere (García Muñoz, A&A, 2023). In color, the dominating contributions to W_0 separated by atom and molecule. From left to right, the dotted lines indicate where the fractional ionization x_e (number density of thermal electrons / total number density of neutrals)=10^{-5}, 10^{-4}, 10^{-3}, 10^{-2} and 10^{-1}. Right panel. In the partial problem for the energy balance considered here, fraction of the primary electrons' energy ($W^E_{\rm chn}/<E_0>W_0$, see text) that goes into ionization, dissociation and excitation. The energy expended in rotational excitation and elastic momentum-transfer collisions is not represented; both types of collisions will result in heating at the densities of interest here. The fluctuations arise from statistical noise in the MC calculations. The subsequent chemical kinetics and radiation problems will dictate how much of that energy is actually channeled into heating, a question that must be determined in the general problem.

CHEOPS observations confirm nodal precession in the WASP-33 system

A. M. S. Smith, Sz. Csizmadia, V. Van Grootel, M. Lendl, C. M. Persson, G. Olofsson, D. Ehrenreich, M. N. Günther, A. Heitzmann, S. C. C. Barros, A. Bonfanti, A. Brandeker, J. Cabrera, O. D. S. Demangeon, L. Fossati, J.-V. Harre, M. J. Hooton, S. Hoyer, Sz. Kalman, S. Salmon, S. G. Sousa, Gy. M. Szabó, T. G. Wilson, Y. Alibert, R. Alonso, J. Asquier, T. Bárczy, D. Barrado, W. Baumjohann, W. Benz, N. Billot, L. Borsato, C. Broeg, A. Collier Cameron, A. C. M. Correia, P. E. Cubillos, M. B. Davies, M. Deleuil, A. Deline, B.-O. Demory, A. Derekas, B. Edwards, J. A. Egger, A. Erikson, A. Fortier, M. Fridlund, D. Gandolfi, K. Gazeas, M. Gillon, M. Güdel, J. Hasiba, Ch. Helling, K. G. Isaak, L. L. Kiss, J. Korth, K. W. F. Lam, J. Laskar, A. Lecavelier des Etangs, D. Magrin, P. F. L. Maxted, B. Merín, C. Mordasini, V. Nascimbeni, R. Ottensamer, I. Pagano, E. Pallé, G. Peter, D. Piazza, G. Piotto, D. Pollacco, D. Queloz, R. Ragazzoni, N. Rando, H. Rauer, I. Ribas, N. C. Santos, G. Scandariato, D. Ségransan, A. E. Simon, M. Stalport, S. Sulis, S. Udry, S. Ulmer-Moll, J. Venturini, E. Villaver, V. Viotto, I. Walter, N. A. Walton, S. Wolf

Astronomy & Astrophysics, in press (arXiv:2412.08557)

Aims: We aim to observe the transits and occultations of WASP-33b, which orbits a rapidly-rotating δ Scuti pulsator, with the goal of measuring the orbital obliquity via the gravity-darkening effect, and constraining the geometric albedo via the occultation depth.
Methods: We observed four transits and four occultations with CHEOPS, and employ a variety of techniques to remove the effects of the stellar pulsations from the light curves, as well as the usual CHEOPS systematic effects. We also performed a comprehensive analysis of low-resolution spectral and Gaia data to re-determine the stellar properties of WASP-33.
Results: We measure an orbital obliquity 111.3 +0.2 -0.7 degrees, which is consistent with previous measurements made via Doppler tomography. We also measure the planetary impact parameter, and confirm that this parameter is undergoing rapid secular evolution as a result of nodal precession of the planetary orbit. This precession allows us to determine the second-order fluid Love number of the star, which we find agrees well with the predictions of theoretical stellar models. We are unable to robustly measure a unique value of the occultation depth, and emphasise the need for long-baseline observations to better measure the pulsation periods.

Download/Website: `https://arxiv.org/abs/2412.08557`

Contact: `alexis.smith@dlr.de`

3 Jobs and Positions

Postdoctoral position at the University of New Mexico

Dr. Diana Dragomir

University of New Mexico in Albuquerque, NM, applications due Jan. 31, 2025. Start date is negotiable.

We invite applications for a postdoctoral researcher position working in exoplanetary science at the University of New Mexico in Albuquerque, to begin in fall 2025. The Department of Physics and Astronomy is located within a new (Fall 2019), state-of-the-art research facility, the Physics and Astronomy and Interdisciplinary Science (PAÍS) building.

The postdoctoral researcher will work in Prof. Diana Dragomir's group, whose research spans exoplanet demographics, atmospheric characterization using HST/JWST observations, stellar abundances as relating to planet composition and formation, and the dynamics of multi-planet systems. The successful candidate will be expected to actively participate in departmental research activities, including attending seminars and working with graduate and undergraduate students. Candidates must have completed a Ph.D. in physics, astronomy, or a closely related field, at the time of hire. Compensation will be commensurate with experience but will be no less than $60,000 and will include benefits. It also includes an allocation for relocation expenses. For best consideration, applications should be received by January 31, 2025.

Minimum Qualifications:

- Candidates must have completed a Ph.D. in physics, astronomy/astrophysics, or planetary science at the time of hire
- Experience with standard astronomical data analysis packages (preferably in Python)

Preferred Qualifications:

- Experience with optical and/or infrared photometric or spectroscopic astronomy observations
- Expertise in noise characterization techniques as applied to astronomical time series and/or statistical studies of exoplanet populations
- Excellent interpersonal, written, and verbal communication skills
- A demonstrated commitment to diversity, equity, inclusion, and student success, as well as working with broadly diverse communities

Applicants must submit an application through UNM Jobs at
https://unm.csod.com/ux/ats/careersite/18/home/requisition/31873?c=unm. A complete application consists of a curriculum vitae, including a list of publications; a cover letter; a statement of research interests and accomplishments, no more than three pages in length; and the contact information for three references (including email address and telephone number) willing to submit letters of recommendation for the applicant.

Questions may be directed to Dr. Diana Dragomir (dragomir@unm.edu). This position is for one year, with renewal up to three years. Applications will be accepted until the position is filled, but for best consideration submit applications by January 31, 2025. The University of New Mexico is an Equal Opportunity/Affirmative Action Employer and Educator. Qualified women and minorities are strongly encouraged to apply.

Contact: `dragomir@unm.edu`

4 Conferences and Workshops

From Transits to Trends: The Next Decade of Long-Period Exoplanets

University of New Mexico in Albuquerque, NM. Aug. 5 - 8, 2025

We are pleased to announce "From Transits to Trends: The Next Decade of Long-Period Exoplanets", a workshop to be held August 5 - 8, 2025, at the University of New Mexico in Albuquerque, NM. The discovery of a growing number of long-period transiting exoplanets accessible to detailed characterization in recent years has enabled the community to expand the parameter space within which exoplanet properties can be investigated, and begin drawing more direct comparisons with Solar System planets. But as studies of these exoplanets often require a larger telescope time investment than their closer-in counterparts, the time is ripe for considering the most pressing questions the community has about this population and how to best address them.

The goals of this meeting are to:

- highlight recent results in the detection, characterization and demographics of transiting exoplanets with orbital periods in the tens-to-hundreds of days;
- foster discussion on how to best maximize the scientific return of studies of this population of exoplanets;
- help inform future observing strategies and mission development

We are currently requesting pre-registrations for the workshop to gauge interest and inform the attendance limit. If you are interested in participating, please complete the pre-registration form by January 31.

Additional details and the workshop website will be available this winter.

Contact: `dragomir@unm.edu`

5^{th} Advanced School on Exoplanetary Science:

"Physical and Dynamical Processes of Exoplanetary Systems"

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 26 to 30 May, 2025

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 5^{th} edition of the School will be focused on the *Physical and Dynamical Processes of Exoplanetary Systems*, mainly covering the theoretical aspects. In particular, the following kew questions will be addressed:

- Physical Processes in Protoplanetary Disks;
- Dynamical Evolution of Exoplanetary Systems;
- Exoplanet Interiors - from Gas Giants to Terrestrial Planets;
- Modeling Exoplanet Atmospheres;
- Planet Formation Models.

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:
Physical Processes in Protoplanetary Disks: Prof. Giuseppe Lodato, University of Milan, I
Planet Formation Models: Dr. Julia Venturini, University of Geneva, CH
Exoplanet Interiors: Prof. Yamila Miguel, NL Institute for Space Research and Leiden University, NL
Modeling Exoplanet Atmospheres: Prof. Giovanna Tinetti, University College London, UK
Dynamical Evolution of Exoplanetary Systems: Prof. Francesco Marzari, University of Padova, I

Fee:
The registration fee is 427 Euro (350 Euro for SCOOL members; read below) and includes a conference kit, coffee breaks, the welcome drink and the social dinner. ASES-5 benefits from the collaboration with "Science is Cool Association" (SCOOL). Participants who intend to profit from the VAT-free registration fee (350 Euro), have to subscribe to SCOOL at the cost of 2 Euro.

Registration, abstract submission:
Registrations are possible until April 4, 2025. 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, 2025). All participants are allowed and encouraged to bring a poster.

Important Dates:

- 14^{th} March 2025: Accommodation Subsidy Deadline
- 4^{th} April 2025: Registration Deadline
- 15^{th} April 2025: Oral contribution Deadline
- 1^{st} May 2025: Final School programme
- $26^{\text{th}} - 30^{\text{th}}$ May 2025: The School

Download/Website: `https://ases5.web.roma2.infn.it/`
Contact: `ases5@lists.roma2.infn.it`

5 As seen on astro-ph

The following list contains exoplanet related entries appearing on astro-ph in December 2024.
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 2024

astro-ph/2412.01001: **Chemical Complexity and Prevalence of Life in the Universe: A New Method for the Estimation of Key Terms of Drake Equation** *by Lukasz Lamza*
astro-ph/2412.01266: **Detectability of biosignatures in warm, water-rich atmospheres** *by Benjamin Taysum et al.*
astro-ph/2412.01895: **CO2-rich protoplanetary discs as a probe of dust radial drift & trapping** *by Andrew D. Sellek et al.*
astro-ph/2412.01878: **The Origins of Lithium Enhancement in Polluted White Dwarfs** *by Benjamin C. Kaiser et al.*
astro-ph/2412.01472: **Time Resolved Absorption of Six Chemical Species With MAROON-X Points to Strong Drag in the Ultra Hot Jupiter TOI-1518 b** *by A. Simonnin et al.*
astro-ph/2412.01409: **An impact-free mechanism to deliver water to terrestrial planets and exoplanets** *by Quentin Kral et al.*
astro-ph/2412.01616: **Concealing Circumbinary Planets with Tidal Shrinkage** *by Saahit Mogan, J. J. Zanazzi*
astro-ph/2412.02743: **History and Habitability of the LP 890-9 Planetary System** *by Rory Barnes et al.*
astro-ph/2412.02847: **Exomoons of Circumbinary Planets** *by Ben R Gordon et al.*
astro-ph/2412.02769: **Discovery and Characterization of an Eccentric, Warm Saturn Transiting the Solar Analog TOI-4994** *by Romy Rodriguez Martinez et al.*
astro-ph/2412.02694: **Increased Surface Temperatures of Habitable White Dwarf Worlds Relative to Main-Sequence Exoplanets** *by Aomawa L. Shields et al.*
astro-ph/2412.02571: **Forming Earth-like and Low-Mass Rocky Exoplanets Through Pebble and Planetesimal Accretion** *by Mitchell John Yzer et al.*
astro-ph/2412.02095: **The Terminator Region Atmosphere of the hot Jupiter WASP-77Ab with ESPRESSO/VLT observations** *by Zewen Jiang et al.*
astro-ph/2412.02069: **Three Warm Jupiters orbiting TOI-6628, TOI-3837, TOI-5027 and one sub-Saturn orbiting TOI-2328** *by Marcelo Tala Pinto et al.*
astro-ph/2412.03739: **A Global Perspective with Updated Constraints on the Ultra-hot Jupiter WASP-19b: Atmospheric Properties and Stellar Activity** *by Abigail A. Tumborang et al.*
astro-ph/2412.03533: **Angular Momentum Drain: Despinning Embedded Planetesimals** *by Stephen Luniewski et al.*
astro-ph/2412.03651: **Image-Constrained Modeling with Hubble and Keck Images Reveals that OGLE-2012-BLG-0563Lb is a Jupiter-Mass planet Orbiting a K Dwarf** *by David P. Bennett et al.*
astro-ph/2412.03411: **A dark, bare rock for TOI-1685 b from a JWST NIRSpec G395H phase curve** *by Rafael Luque et al.*
astro-ph/2412.02963: **Solar System Migration Points to a Renewed Concept: Galactic Habitable Orbits** *by Junichi Baba et al.*
astro-ph/2412.03416: **Transiting Jupiters around M-dwarfs have similar masses to FGK warm-Jupiters** *by Shubham Kanodia*
astro-ph/2412.04599: **SDSS J100711.74+193056.2: A Candidate Common Motion Substellar Companion to the Nearest B-Type Star Regulus** *by Eric E. Mamajek, Adam J. Burgasser*
astro-ph/2412.04598: **Chondrites as thermal and mechanical archives of accretion processes in the Solar protoplanetary disk** *by Anthony Seret, Guy Libourel*
astro-ph/2412.04597: **New Ultracool Companions to Nearby White Dwarfs** *by Alexia Bravo et al.*

astro-ph/2412.04583: **A substellar flyby that shaped the orbits of the giant planets** *by Garett Brown et al.*
astro-ph/2412.04568: **Machine learning approach for mapping the stable orbits around planets** *by Tiago F. L. L. Pinheiro et al.*
astro-ph/2412.04552: **True mass and atmospheric composition of the non-transiting hot Jupiter HD 143105 b** *by Luke Finnerty et al.*
astro-ph/2412.04438: **From Misaligned Sub-Saturns to Aligned Brown Dwarfs: The Highest $M_{\rm p}/M_*$ Systems Exhibit Low Obliquities, Even around Hot Stars** *by Jace Rusznak et al.*
astro-ph/2412.04356: **Water Ice in the Edge-On Orion Silhouette Disk 114–426 from JWST NIRCam Images** *by Nicholas P. Ballering et al.*
astro-ph/2412.04359: **DARWEN: Data-driven Algorithm for Reduction of Wide Exoplanetary Networks** *by A. Lira-Barria et al.*
astro-ph/2412.03923: **Predictions of Dust Continuum Emission from a Potential Circumplanetary Disk: A Case Study of the Planet Candidate AB Aurigae b** *by Yuhito Shibaike et al.*
astro-ph/2412.04018: **Modeling the astrosphere of LHS 1140** *by K. Scherer et al.*
astro-ph/2412.04079:
astro-ph/2412.04330: **The GAPS programme at TNG LXVI. A homogeneous search for Na i and its possible variability in ten gas giant exoplanets** *by D. Sicilia et al.*
astro-ph/2412.05423: **A joint effort to discover and characterize two resonant mini Neptunes around TOI-1803 with TESS, HARPS-N and CHEOPS** *by T. Zingales et al.*
astro-ph/2412.05258: **Using the helium triplet as a tracer of the physics of giant planet outflows** *by Matthäus Schulik, James Owen*
astro-ph/2412.05188: **Novel Physics of Escaping Secondary Atmospheres May Shape the Cosmic Shoreline** *by Richard D. Chatterjee, Raymond T. Pierrehumbert*
astro-ph/2412.05054: **The effect of radiation pressure on the dispersal of photoevaporating discs** *by Alfie Robinson et al.*
astro-ph/2412.05005: **Eta-Earth Revisited I: A Formula for Estimating the Maximum Number of Earth-like Habitats** *by Helmut Lammer et al.*
astro-ph/2412.05002: **Eta-Earth Revisited II: Deriving a Maximum Number of Earth-like Habitats in the Galactic Disk** *by Manuel Scherf et al.*
astro-ph/2412.04681: **Water Enrichment from Pebble Drift in Disks with Gap-forming Planets** *by Whittney Easterwood et al.*
astro-ph/2412.05099: **C/O ratios in self-gravitating protoplanetary discs with dust evolution** *by Tamara Molyarova et al.*
astro-ph/2412.05535: **The First JWST View of a 30-Myr-old Protoplanetary Disk Reveals a Late-stage Carbon-rich Phase** *by Feng Long et al.*
astro-ph/2412.05609: **TOI-4504: Exceptionally large Transit Timing Variations induced by two resonant warm gas giants in a three planet system** *by Michaela Vítková et al.*
astro-ph/2412.05988: **A potential exomoon from the predicted planet obliquity of β Pictoris b** *by Michael Poon et al.*
astro-ph/2412.06955: **Linear bending wave propagation in laminar and turbulent discs** *by Callum W. Fairbairn*
astro-ph/2412.06648: **Resolved convection in hydrogen-rich atmospheres** *by Jacob T. Seeley, Robin D. Wordsworth*
astro-ph/2412.06594: **On the formation of super-Jupiters: Core Accretion or Gravitational Instability?** *by M. Nguyen, V. Adibekyan*
astro-ph/2412.06573: **Population-level Hypothesis Testing with Rocky Planet Emission Data: A Tentative Trend in the Brightness Temperatures of M-Earths** *by Brandon Park Coy et al.*
astro-ph/2412.06404: **A multi-technique detection of an eccentric giant planet around accelerating star HD 57625** *by D. Barbato et al.*
astro-ph/2412.06137: **Metallicity Dependence of Giant Planets around M Dwarfs** *by Tianjun Gan et al.*

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