ExoPlanet News
An Electronic Newsletter

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Editors: E. Alei, J. Davoult, H. Wang, D. Angerhausen & T.-E. Riesen
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Contents

1 Editorial

Welcome to Edition 167 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 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 June 13, 2023.

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

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

2 Abstracts of refereed papers

The interplay between pebble and planetesimal accretion in population synthesis models and its role in giant planet formation

A. Kessler, Y. Alibert
Physikalisches Institut, University of Bern, Gesellschaftsstrasse 6, 3012 Bern, Switzerland

Astronomy & Astrophysics, in press (arXiv:2304.12788)

In the core accretion scenario of planet formation, rocky cores grow by first accreting solids until they are massive enough to accrete gas. For giant planet formation, this means that a massive core must form within the lifetime of the gas disk. Inspired by observations of Solar System features such as the asteroid and Kuiper belts, the accretion of roughly kilometre-sized planetesimals is traditionally considered as the main accretion mechanism of solids but such models often result in longer planet formation timescales. The accretion of millimetre- to centimetre-sized pebbles, on the other hand, allows for rapid core growth within the disk lifetime. The two accretion mechanisms are typically discussed separately. We investigate the interplay between the two accretion processes in a disk containing both pebbles and planetesimals for planet formation in general and in the context of giant planet formation specifically. The goal is to disentangle and understand the fundamental interactions that arise in such hybrid pebble-planetesimal models laying the groundwork for informed analysis of future, more complex, simulations. We combined a simple model of pebble formation and accretion with a global model of planet formation which considers the accretion of planetesimals. We compared synthetic populations of planets formed in disks composed of different amounts of pebbles and 600 metre-sized planetesimals to identify the impact of the combined accretion scenario. On a system level, we studied the formation pathway of giant planets in these disks. We find that, in hybrid disks containing both pebbles and planetesimals, the formation of giant planets is strongly suppressed, whereas, in a pebbles-only or planetesimals-only scenario, giant planets can form. We identify the heating associated with the accretion of up to 100 kilometre-sized planetesimals after the pebble accretion period to delay the runaway gas accretion of massive cores. Coupled with strong inward type-I migration acting on these planets, this results in close-in icy sub-Neptunes originating from the outer disk. We conclude that, in hybrid pebble-planetesimal scenarios, the late accretion of planetesimals is a critical factor in the giant planet formation process and that inward migration is more efficient for planets in increasingly pebble-dominated disks. We expect a reduced occurrence rate of giant planets in planet formation models that take the accretion of pebbles and planetesimals into account.

Download/Website: `https://doi.org/10.1051/0004-6361/202245641`

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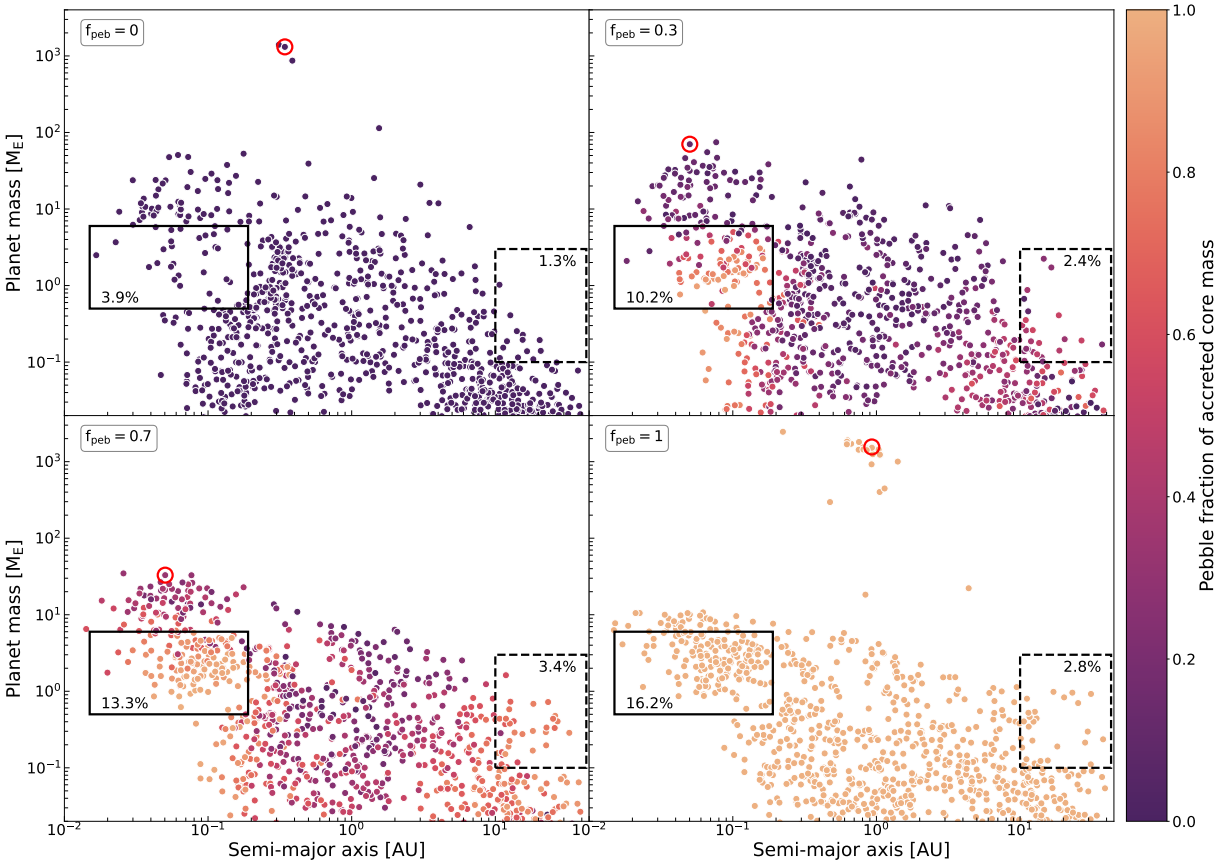

Figure 1: Planet mass over semi-major axis of one thousand single-planet simulations after 2 Gyr for pebble fractions f_{peb} = 0 (planetesimals-only), f_{peb} = 0.3 (pebble-poor), f_{peb} = 0.7 (pebble-rich), and f_{peb} = 1 (pebbles-only). The solid-line boxes highlight planet masses of 0.5 to 6 M_E in the inner disk region up to 0.2 AU. The dashed-line boxes highlight planet masses above 0.1 M_E outside of 10 AU. The boxes are labelled with the percentage of planets in these regions. The colour of the points indicates the fraction of accreted pebbles compared to the total mass of accreted solids. The darkest points are fully planetesimal-formed planets and the brightest points are planets formed only by pebbles. The encircled points are planets that formed from the same disk with different pebble fractions.

Traveling Planetary-scale Waves Cause Cloud Variability on Tidally Locked Aquaplanets

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The Planetary Science Journal, published (2023PSJ.....4...68C)

Cloud cover at the planetary limb of water-rich Earth-like planets is likely to weaken chemical signatures in transmission spectra, impeding attempts to characterize these atmospheres. However, based on observations of Earth and solar system worlds, exoplanets with atmospheres should have both short-term weather and long-term climate variability, implying that cloud cover may be less during some observing periods. We identify and describe a mechanism driving periodic clear sky events at the terminators in simulations of tidally locked Earth-like planets. A feedback between dayside cloud radiative effects, incoming stellar radiation and heating, and the dynamical state of the atmosphere, especially the zonal wavenumber-1 Rossby wave identified in past work on tidally locked planets, leads to oscillations in Rossby wave phase speeds and in the position of Rossby gyres and results in advection of clouds to or away from the planet's eastern terminator. We study this oscillation in simulations of Proxima Centauri b, TRAPPIST 1-e, and rapidly rotating versions of these worlds located at the inner edge of their stars' habitable zones. We simulate time series of the transit depths of the 1.4 μm water feature and 2.7 μm carbon dioxide feature. The impact of atmospheric variability on the transmission spectra is sensitive to the structure of the dayside cloud cover and the location of the Rossby gyres, but none of our simulations have variability significant enough to be detectable with current methods.

Download/Website: `https://iopscience.iop.org/article/10.3847/PSJ/acc9c4`

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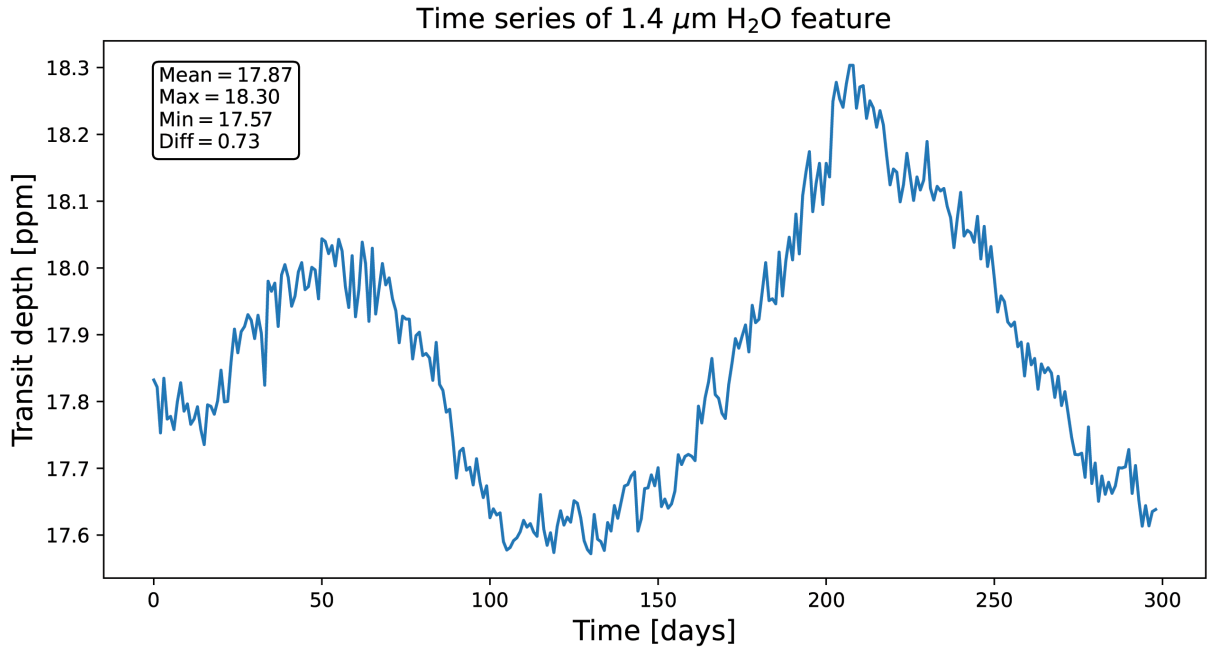

Figure 2: Time series of the 1.4 μm water absorption feature for the Warm ProxB simulation, showing an oscillation in the transit depth correlated to variability in cloud cover at the planetary limb.

The GAPS programme at TNG XLIII. A massive brown dwarf orbiting the active M dwarf TOI-5375

J. Maldonado[1], A. Petralia[1], G. Mantovan[2], M. Rainer[3], A. F. Lanza[4], C. Di Maio[5,1], S. Colombo[1], D. Nardiello[6], S. Benatti[1], L. Borsato[6], I. Carleo[7], S. Desidera[6], G. Micela[1], V. Nascimbeni[2,6], L. Malavolta[2], M. Damasso[8], A. Sozzetti[8], L. Affer[1], K. Biazzo[9], A. Bignamini[10], A. S. Bonomo[8], F. Borsa[3], M. B. Lund[11], L. Mancini[12,13,8], E. Molinari[14], & M. Molinaro[10]

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Astronomy & Astrophysics, in press, arXiv:2304.04477

Context. Massive substellar companions orbiting active low-mass stars are rare. They, however, offer an excellent opportunity to study the main mechanisms involved in the formation and evolution of substellar objects. Aims. We aim to unravel the physical nature of the transit signal observed by the TESS space mission on the active M dwarf TOI-5375. Methods. We analysed the available TESS photometric data as well as high-resolution (R $\sim$ 115000) HARPS-N spectra. We combined these data to characterise the star TOI-5375 and to disentangle signals related to stellar activity from the companion transit signal in the light-curve data. We ran an MCMC analysis to derive the orbital solution and apply state-of-the-art Gaussian process regression to deal with the stellar activity signal. Results. We reveal the presence of a companion in the brown dwarf / very-low-mass star boundary orbiting around the star TOI-5375. The best-fit model corresponds to a companion with an orbital period of 1.721564 $\pm$ 10^{-6} d, a mass of 77 $\pm$ 8 $M_{\rm J}$ and a radius of 0.99 $\pm$ 0.16 $R_{\rm J}$. Conclusions. We derive a rotation period for the host star of 1.9692 $\pm$ 0.0004 d, and we conclude that the star is very close to synchronising its rotation with the orbital period of the companion.

Download/Website: `https://arxiv.org/abs/2304.04477`

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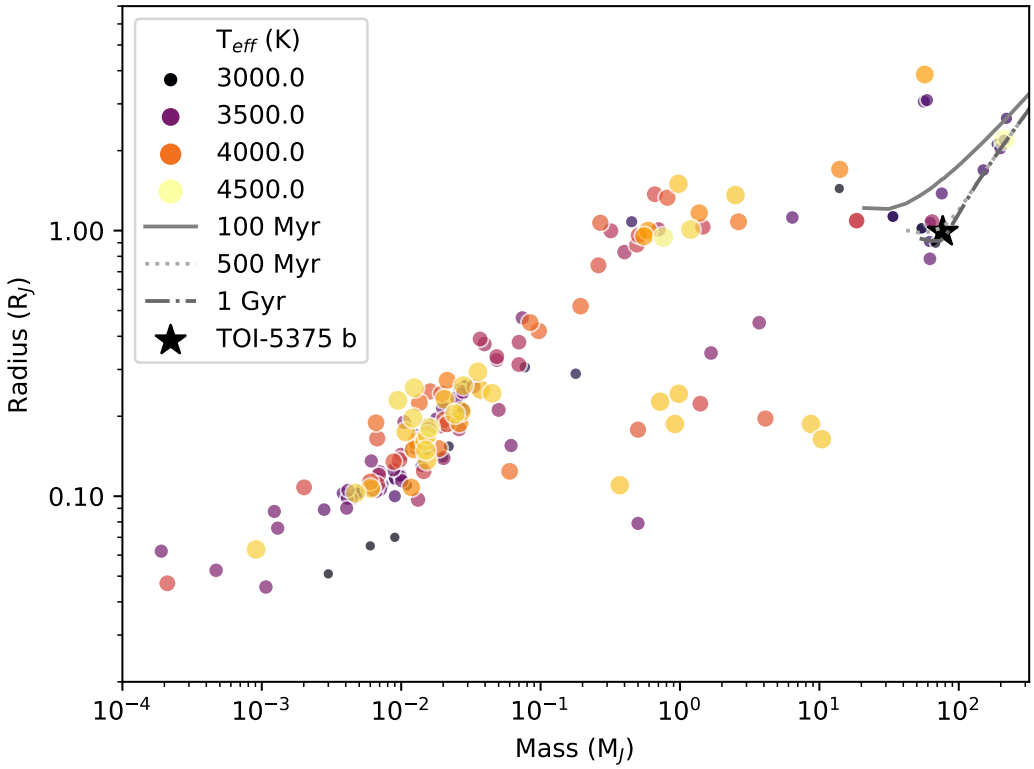

Figure 3: Known substellar companions and low-mass stars (radius versus mass) around late-K and M dwarfs (As listed at http://exoplanet.eu/). Different colours and symbol sizes indicate the effective temperature of the host star. Models for substellar objects and low-mass stars with solar metallicity from Baraffe et al. (2015) are overplotted with grey lines.

The Planetary Accretion Shock. III. Smoothing-free 2.5D simulations and calculation of H α emission

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The Astrophysical Journal, in press (arXiv:2305.01679)

Surveys have looked for H α emission from accreting gas giants but found very few objects. Analyses of the detections and non-detections have assumed that the entire gas flow feeding the planet is in radial free-fall. However, hydrodynamical simulations suggest that this is far from reality. We calculate the H α emission from multidimensional accretion onto a gas giant, following the gas flow from Hill-sphere scales down to the circumplanetary disc (CPD) and the planetary surface. We perform azimuthally-symmetric radiation-hydrodynamics simulations around the planet and use modern tabulated gas and dust opacities. Crucially, contrasting with most previous simulations, we do not smooth the gravitational potential and do follow the flow down to the planetary surface, where grid cells are 0.01 Jupiter radii small radially. We find that only roughly one percent of the net gas inflow into the Hill sphere reaches directly the planet. As expected for ballistic infall trajectories, most of the gas falls at too large a distance on the CPD to generate H α. Including radiation transport removes the high-velocity sub-surface flow previously seen in hydrodynamics-only simulations, so that only the free planet surface and the inner regions of the CPD emit substantially H α. Unless magnetospheric accretion, which we neglect here, additionally produces H α, the corresponding H α production efficiency is much smaller than usually assumed, which needs to be taken into account when analysing (non-)detection statistics.

Download/Website: `http://arxiv.org/abs/2305.01679`

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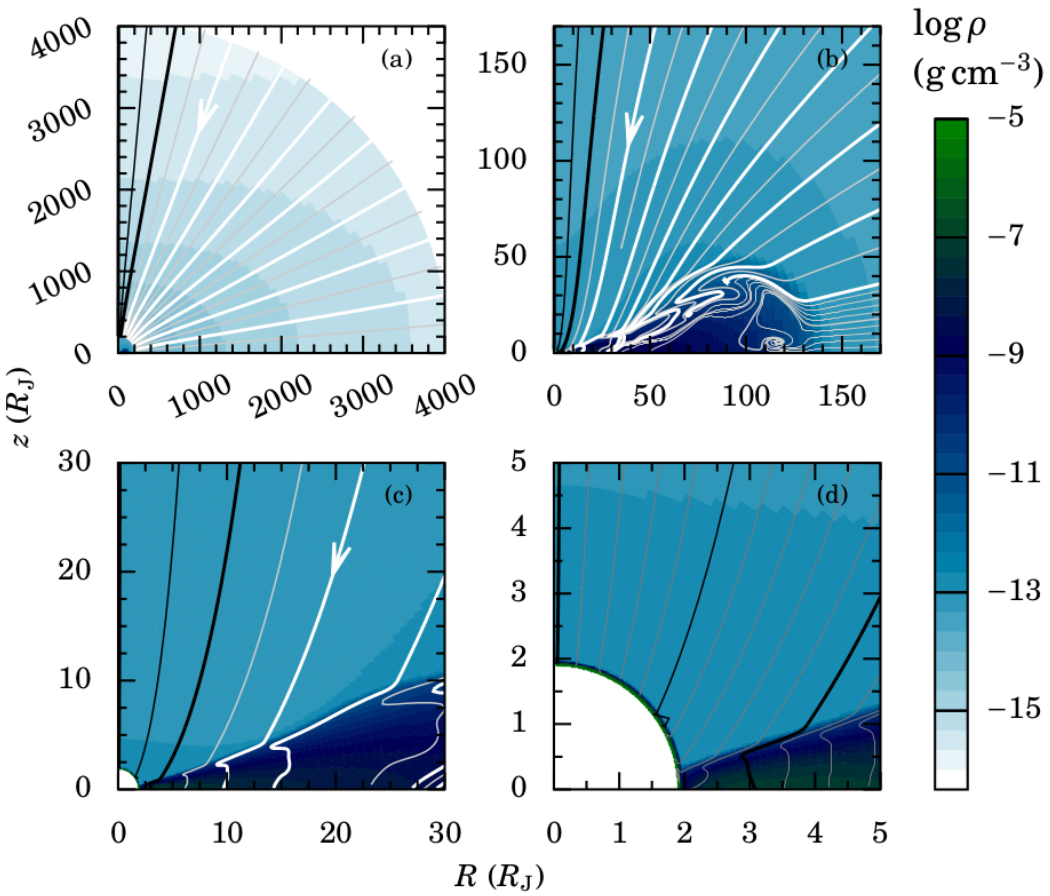

Figure 4: Density structure (colour) and flow pattern (lines) from Hill-sphere to planetary-radius scales for an accreting gas giant. The gas falls in supersonically and shocks on the planet and CPD surfaces. Streamlines start at $R_{\rm Hill} = 4100\ R_{\rm J}$ at angles $\theta_{\rm init} = 0.5°$ and from 5° up to 85° in steps of 5° (panels (a)–(d); thick: multiples of 10°) or also 1° (panels (b) and (d)). Due to angular momentum conservation, the arrow-bearing streamline with $\theta_{\rm init} = 20°$, for example, hits the CPD with $\theta \gg 20°$ and not on the planet surface. Only gas starting at the Hill sphere within $\theta_{\rm init} \approx 10°$ from the pole shocks with sufficient velocity to generate H α ($\theta_{\rm init} = 0.5$, 5, 10°: black), with $v_{\rm preshock} \gtrsim 25$ km s^{-1}. This involves only around 1 % of the gas flowing into the Hill sphere; most lands too slowly for any line emission.

The Hamiltonian for von Zeipel–Lidov–Kozai oscillations

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Monthly Notices of the Royal Astronomical Society, published (2023MNRAS.522..937T)

The Hamiltonian used in classical analyses of von Zeipel–Lidov–Kozai or ZLK oscillations in hierarchical triple systems is based on the quadrupole potential from a distant body on a fixed orbit, averaged over the orbits of both the inner and the outer bodies ("double-averaging"). This approximation can be misleading, because the corresponding Hamiltonian conserves the component of angular momentum of the inner binary normal to the orbit of the outer binary, thereby restricting the volume of phase space that the system can access. This defect is usually remedied by including the effects of the octopole potential, or by allowing the outer orbit to respond to variations in the inner orbit. However, in a wide variety of astrophysical systems nonlinear perturbations are comparable to or greater than these effects. The long-term effects of nonlinear perturbations are described by an additional Hamiltonian, which we call Brown's Hamiltonian. At least three different forms of Brown's Hamiltonian are found in the literature; we show that all three are related by a gauge freedom, although one is much simpler than the others. We argue that investigations of ZLK oscillations in triple systems should include Brown's Hamiltonian.

Download/Website: `https://arxiv.org/abs/2304.01257`

Contact: `tremaine@ias.edu`

Population study on MHD wind-driven disc evolution Confronting theory and observation

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Astronomy & Astrophysics, in press (arXiv:2304.12380)

Context. Current research has established magnetised disc winds as a promising way of driving accretion in protoplanetary discs. Aims. We investigate the evolution of large protoplanetary disc populations under the influence of magnetically driven disc winds as well as internal and external photoevaporation. We aim to constrain magnetic disc wind models through comparisons with observations. Methods. We ran 1D vertically integrated evolutionary simulations for low-viscosity discs, including magnetic braking and various outflows. The initial conditions were varied and chosen to produce populations that are representative of actual disc populations inferred from observations. We then compared the observables from the simulations (e.g. stellar accretion rate, disc mass evolution, disc lifetime, etc.) with observational data. Results. Our simulations show that to reach stellar accretion rates comparable to those found by observations $\sim 10^{-8}\mathrm{M}_{\odot}/\mathrm{yr}$, it is necessary to have access not only to strong magnetic torques, but weak magnetic winds as well. The presence of a strong magnetic disc wind, in combination with internal photoevaporation, leads to the rapid opening of an inner cavity early on, allowing the stellar accretion rate to drop while the disc is still massive. Furthermore, our model supports the notion that external photoevaporation via the ambient far-ultraviolet radiation of surrounding stars is a driving force in disc evolution and could potentially exert a strong influence on planetary formation. Conclusions. Our disc population syntheses show that for a subset of magnetohydrodynamic wind models (weak disc wind, strong torque), it is possible to reproduce important statistical observational constraints. The magnetic disc wind paradigm thus represents a novel and appealing alternative to the classical α-viscosity scenario.

Download/Website: `https://arxiv.org/abs/2304.12380`

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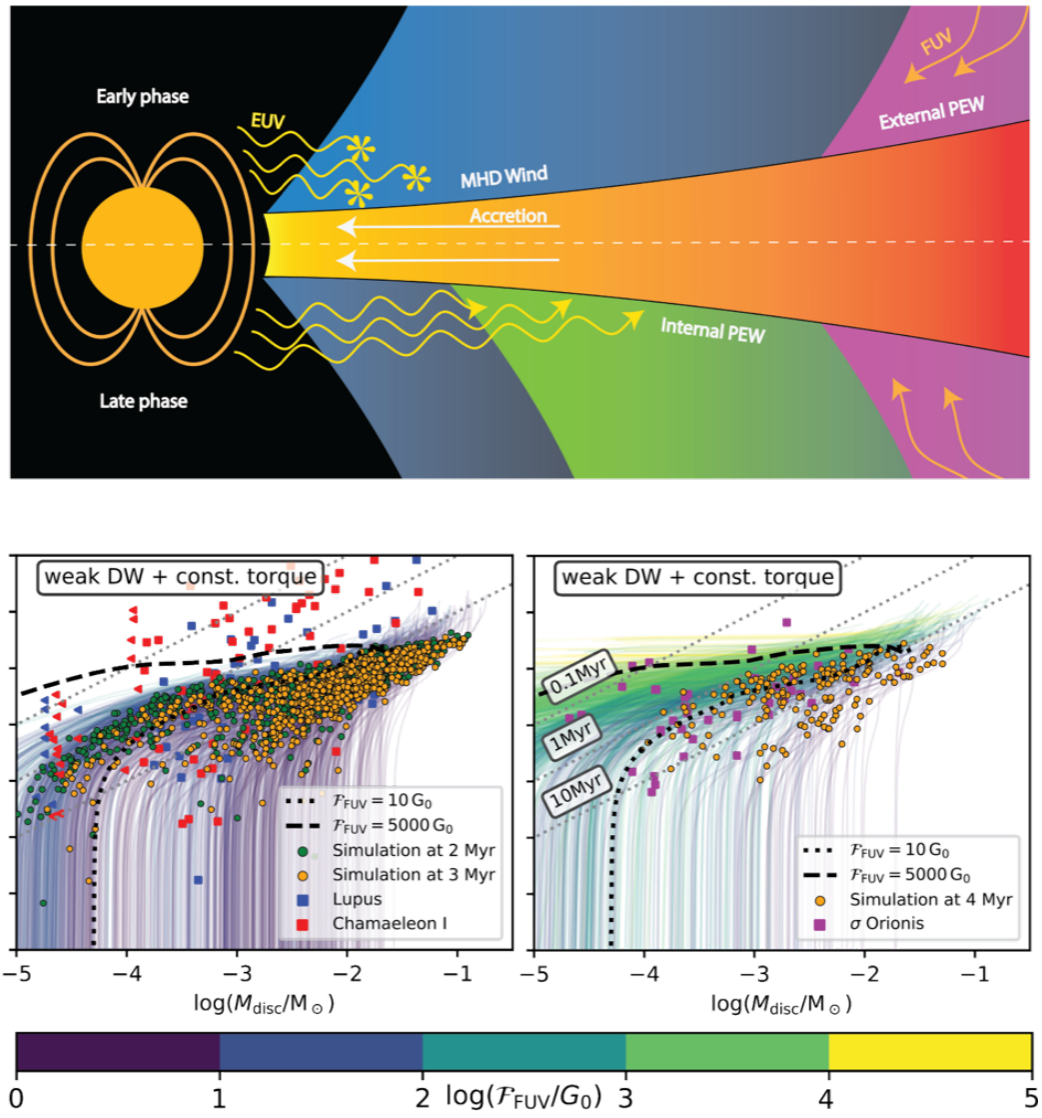

Figure 5: The top panel shows a schematic representation of the physical processes included in our disc evolution model. In an early phase, where EUV radiation is shielded by the emerging MHD wind, the magnetic wind and external photoevaporation dominate the disc evolution. At a later stage, internal photoevaporation dominates and can lead to disc dispersal. In the bottom panel we show evolutionary tracks for two synthetic disc populations (i.e. with a weak (left) and strong (right) ambient FUV field strength). Evolution tracks of individual systems are coloured by FUV field strength and snapshots at specific times are shown for comparison with observed populations. Tracks of exemplary cases are highlighted with black dashed and dotted lines. Lines of constant $M_{\rm disc}/\dot{M}_{\rm acc}$ are shown for 0.1, 1 and 10 Myr (thin dotted lines).

GANBISS: A new GPU accelerated N-body code for Binary Star Systems

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Celestial Mechanics and Dynamical Astronomy, in press

We present a GPU accelerated N-body integrator using the Bulirsch-Stoer method, called GANBISS(**G**PU **A**ccelerated **N**-body code for **B**inary **S**tar **S**ystems). It is designed to simulate the dynamical evolution of planetesimal disks in binary star systems which contain some thousand disk objects. However, it can also be used for studies of non-interacting massless bodies where up to 50 million objects can be studied in a simulation. GANBISS shows the energy and angular momentum conservation behavior of non-symplectic integration methods. The code is written in CUDA C and can be run on NVIDIA GPUs of compute capability of at least 3.5.
A comparison of GPU and CPU computations indicates a speed-up of the GPU performance of up to 100 times – depending on the number of disk objects.

Download/Website: `https://www.researchsquare.com/article/rs-2382947/v1`

Contact: `maximilian.zimmermann@univie.ac.at`

3 Jobs and Positions

Research Assistant/Research Associate in Debris Disks

Prof. Mark Wyatt

Institute of Astronomy, University of Cambridge, UK

The Institute of Astronomy (IoA) at the West Cambridge site has a vacancy for a postdoctoral researcher to collaborate with Professor Mark Wyatt on a programme seeking to understand the nature of the planetary systems of nearby stars through study of their debris disks and exozodi. The research covers both observations of nearby stars (e.g., with ALMA, LBTI, VLTI, JWST), and analytical and numerical modelling of debris disks (e.g., dynamical interactions with planets, collisional evolution and fragmentation, gas disk evolution), and aims to forge strong links to the fields of planet formation, extrasolar planets, proto-planetary disks and planetary sciences. The successful applicant would complement the team already working on the programme, and join a growing concentration of researchers in Cambridge working on topics related to extrasolar planets and disks. Synergies with complementary interdisciplinary research are also being fostered through the newly established Leverhulme Centre for Life in the Universe (https://www.lclu.cam.ac.uk/).

The successful applicant will be expected to pursue research within the context of the above programme and would also be encouraged to pursue their own research. They would be expected to develop a high degree of interaction with the faculty, postdoctoral researchers and research students, to conduct a highly competitive programme of scientific research, prepare proposals to secure research resources (for example, access to high-performance computing and telescopes) and write scientific articles for publication in peer-reviewed journals. Applicants must have excellent communication and computing skills.

Applicants must have a PhD in Astronomy or a related field, or have satisfied the requirements for the PhD, by the time of appointment. Appointment at Research Associate level is dependent on having a PhD. Those who have submitted but not yet received their PhD will initially be appointed as a Research Assistant (Grade 5, Point 38 £30,497) moving to Research Associate (Grade 7) upon confirmation of your PhD award.

The University of Cambridge thrives on the diversity of its staff and students. The Institute particularly welcomes applications from women and/or candidates from a BME background for this vacancy as they are currently underrepresented. We have an active Equality, Diversity and Inclusion Committee which continually works to further the aims of the Athena SWAN charter. The University has a number of family-friendly policies and initiatives, including a returning-carer scheme, childcare costs support, university workplace nurseries, university holiday playschemes, and a shared parental-leave policy. As part of its commitment to providing a family-friendly environment for researchers, the IoA ensures that should parental leave be needed during the course of employment, there is provision for extension to contract to compensate for the parental leave taken.

Please submit your application by 23:59 GMT of the closing date of **Wednesday 25th May 2023**. Please refer to further particulars for full instructions and be aware that referees will be asked to supply reference letters by 25th May 2023. If you have any queries about your application please contact Mrs Ashley Worman (hr@ast.cam.ac.uk). Informal enquiries may be addressed to Professor Mark Wyatt (wyatt@ast.cam.ac.uk).

Fixed-term: The funds for this post are available for 3 years in the first instance.

Download/Website: `https://www.jobs.cam.ac.uk/job/40668/`

Contact: `Informal enquiries may be addressed to Prof. Mark Wyatt (wyatt@ast.cam.ac.uk).`

4 Conferences and Workshops

30th Aniversary of the Rencontres du Vietnam: Windows on the Universe (Windows on Planets)

Thierry Montmerle, Hien T. Nguyen, Rosemary Mardling, Michel Mayor

Quy Nhon, Vietnam, 6-12 August 2023

This year, the third Windows on the Universe conference will celebrate the 30th Anniversary Conference of the Rencontres du Vietnam. It will consist of two joint conferences: Windows on the Universe: Particle Physics and Windows on the Universe: Astrophysics. The Conference will include Common sessions and each conference will hold in separate parallel Plenary sessions. The ”Common sessions”, held each day, will consist of invited, unspecialized presentations of interest to both the Particle Physics and Astrophysics communities, while the ”Plenary sessions” will be more focused and address scientific highlights of interest for each community, keeping in mind the wide range of topics addressed.
Special emphasis is being placed on active participation by young researchers (bright PhD students, postdocs, early career scientists, etc.). In particular, selected contributed talks will be presented during the Plenary sessions along with Plenary talks. More contributed talks will be accommodated in parallel sessions.

Download/Website: `http://vietnam.in2p3.fr/2023/windows`

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ESA's Hack An Exoplanet: Support us spreading the word about this educational hackathon activity built on CHEOPS observations

European Space Agency (ESA)

Schools in all our member states and the entire world can help us profile the mysterious KELT-3b and TOI–560 c exoplanets by analysing data from CHEOPS, a real ESA scientific satellite. This activity is targeted at teams of students aged 14 to 19 years old. Please support us in spreading the word by forwarding this advertisement to your local schools, incorporating it in your outreach channels, or making the material part of your very own educational events.

In early 2023, ESA's CHEOPS (CHaracterising ExOPlanet Satellite) observed two exoplanet targets, KELT-3 b and TOI-560 c for this hackathon. By joining a Hack an Exoplanet event, teams of secondary students will get the opportunity to analyse this real satellite data collected by CHEOPS and hack these mysterious alien worlds. You can be one of the first people ever to uncover the secrets of these exoplanets! Learn more and access the Hack an Exoplanet challenges at the link below.

Schools can access the hackathon challenges today. We have a case on our hands, of two mysterious exoplanets, and we need your help to profile them. Find out how you can use real satellite data to investigate an alien planet and become an exoplanet detective in the first ever ESA Education hackathon for secondary students. The hackathon activities are available in 21 different languages.

Start your Hack an Exoplanet detective work now. The first challenge is the analysis of the transit light curve of the giant exoplanet KELT-3 b. By following the instructions in the supporting material and/or following the information in the instructional videos, the students will be able to derive the properties of KELT-3 b. The teams' challenges are available in the following languages: English, Czech, Danish, Dutch, Estonian, Finnish, French, German, Greek, Hungarian, Italian, Latvian, Lithuanian, Norwegian, Polish, Portuguese, Romanian, Slovak, Slovenian, Spanish, and Swedish.

How to participate? Online and physical hackathons will be organised in April, May and June 2023, and you can even host your own hackathon at your school! The hackathon activities developed with the support of ESA experts are freely available on the platform in multiple languages. Find out via the link below how you can join or host an event.

Download/Website: `https://hackanexoplanet.esa.int/`

Contact: `hackanexoplanet@esa.int`

ESA Brainstorming on Astrobiology

European Space Agency (ESA)

Dear colleagues,

ESA is organising an open, focused, and multidisciplinary workshop – a Brainstorming on Astrobiology – this autumn. On behalf of the Organising Committee, we are delighted to invite you to apply to participate as an expert. At this workshop, we aim to connect experts on themes related to astrobiology from ESA and the wider scientific community, with the goal of fostering new collaborations, connecting across complementary fields, and identifying ways to progress effectively, while leveraging the state-of-the art in current and future facilities and theory. We will engage with the wider scientific community and public during the conference via public talks as well as afterwards by publishing the outcome of the workshop via our website and/or a high-impact journal.
As discussions and connecting across the different themes covered are so central to the success of the workshop, we request all participants to attend as much of the workshop as possible. Experts in related areas are encouraged to be in contact beforehand to identify common themes and potential points of discussion, as a key goal of the workshop is to foster discussion.
Please submit your application by **15 June 2023** if you are available to participate and contribute to this workshop. We are of course happy to discuss further should you have any questions and look forward to hearing from you.

Best regards
Maximilian N. Günther
On behalf of the Organising Committee

More information:
When? **16 - 20 October 2023**
Where? **ESTEC, The Netherlands**

Download/Website: `https://www.cosmos.esa.int/web/exoplanetsworkinggroup/esa-brainstorming-on-astrobiology`
Contact: `esa-brainstorming@cosmos.esa.int`

5 Exoplanet Archives

April 2023 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, May 9, 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`).

April 20, 2023

Six New Planets, Including Directly Imaged HIP 99770 b

This week's crop of six planets includes HIP 99770 b, a gas giant found orbiting an accelerating star—an interesting case because researchers used astrometry to identify stars showing some acceleration, and then conducted a direct imaging survey on those stars. Learn more in the ESA media release (`https://bit.ly/3VodlDI`) and the discovery paper (`https://bit.ly/3LQovhr`).

The other new planets are TOI-733 b, Kepler-68 e, Kepler-454 d, K2-312 c, and Kepler-10 d. There are also new parameter sets for 70 planets.

April 13, 2023

New TRAPPIST-1 b Emission Spectrum and 10 Planets

We've updated our Emission Spectroscopy table (`https://bit.ly/2vOLcem`) to include the newest JWST thermal emission measurement on TRAPPIST-1 b. Learn more about the new result in NASA's media release (`https://go.nasa.gov/41UUD9h`) and the discovery paper (`https://bit.ly/3Lu3Le1`).

There are also 10 new planets this week. They are: PZ Tel b, TOI-2338 b, TOI-2589 b, TOI-4406 b, KMT-2018-BLG-0030L b, KMT-2018-BLG-0087L b, KMT-2018-BLG-0247L b, KMT-2018-BLG-2602L b, OGLE-2018-BLG-0298L b, and OGLE-2018-BLG-1119L b.

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

Contact: `mharbut@caltech.edu`

6 Other

Reminder:
4th Announcement of Opportunity for the CHEOPS Guest Observers Programme

European Space Agency (ESA)

Invitation
ESA's Director of Science is pleased to invite you to respond to the 4th Announcement of Opportunity for the CHEOPS Guest Observers Programme.
The detailed schedule of milestones for this announcement, together with the software tools and documentation needed to prepare proposals, are available on the website (see below).
We would appreciate if you could circulate this Announcement to interested colleagues in your institute.

What is the AO-4 Call?
ESA's Characterising Exoplanets Satellite (CHEOPS) 4th Announcement of Opportunity (AO-4) for the submission of proposals to the Guest Observers (GO) Programme has opened on 4 April 2023 (12:00 noon CEST) and will close on 25 May 2023 (12:00 noon CEST). The observing cycle will run from 25 September 2023 until 31 September 2024 and thus mark the beginning of CHEOPS' first mission extension, which was recently approved by ESA's Science Programme Committee.
Importantly, the CHEOPS AO-4 Call is foreseen to come with several novelties to further enhance the community access and GO experience: - only 50 reserved targets, with all the rest being open to the entire community - up to 30- double anonymous peer-review of proposals
CHEOPS offers the GO observers space-based ultra-high precision photometry for the observation of exoplanet transits, eclipses, occultations, phase-curves, and more. Science cases may range from exoplanets to exomoons, ring structures, stellar activity, trans-Neptunian objects, and beyond. The timely overlap of several space- and ground-based missions can provide opportunities for synergies with NASA/ESA/CSA JWST, NASA/ESA HST, NASA TESS, ESO ground-based facilities, and more.

What is CHEOPS?
ESA's CHEOPS is the first space mission designed for searching for exoplanetary transits and occultations on bright stars already known to host planets by performing ultrahigh precision photometry.
CHEOPS is an ESA mission implemented in partnership with Switzerland, through the Swiss Space Office (SSO). The University of Bern leads a consortium of 11 ESA Member States contributing to the mission and represented in the CHEOPS Science Team. ESA is the mission architect responsible for overall mission definition and procurement of the spacecraft and launch.
ESA is also responsible for the early operations phase executed by the spacecraft contractor, Airbus Defence and Space–Spain (ASE). In addition, ESA is responsible for running the CHEOPS Guest Observers (GO) Programme, a competitive and peer-reviewed process, through which the science community can apply for 30% of science observations time during the first extended mission (20% during the nominal mission).
The science instrument is led by the University of Bern, with important contributions from Austria, Belgium, Germany and Italy. Other contributions to thescience instrument, in the form of hardware or science operations, are provided by Hungary, France, Portugal, Sweden, and the United Kingdom. CHEOPS was launched from Europe's spaceport in Kourou, French Guiana on 18 December 2019 on a Soyuz rocket operated by Arianespace. Following a successful in-orbit commissioning of the spacecraft, responsibility for operations was taken over by the CHEOPS Mission Consortium, with the Mission Operations Centre under the responsibility of INTA, Spain, and the Science Operations Centre led by the University of Geneva, Switzerland.

Download/Website: *https://www.cosmos.esa.int/web/cheops-guest-observers-programme/ao-4*

Contact: cheops-support@cosmos.esa.int

7 As seen on astro-ph

The following list contains exoplanet related entries appearing on astro-ph in April 2023.
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.

April 2023

astro-ph/2304.00031: **Coherent radio bursts from known M-dwarf planet host YZ Ceti** *by J. Sebastian Pineda, Jackie Villadsen*
astro-ph/2304.00073: **Towards 3D Retrieval of Exoplanet Atmospheres: Assessing Thermochemical Equilibrium Estimation Methods** *by Michael D. Himes et al.*
astro-ph/2304.00071: **The Kepler Giant Planet Search. I: A Decade of Kepler Planet Host Radial Velocities from W. M. Keck Observatory** *by Lauren M. Weiss et al.*
astro-ph/2304.00224: **The CARMENES search for exoplanets around M dwarfs – A deep transfer learning method to determine Teff and [M/H] of target stars** *by A. Bello-García et al.*
astro-ph/2304.00461: **Detection of TiO and VO in the atmosphere of WASP-121b and Evidence for its temporal variation** *by Qinglin Ouyang et al.*
astro-ph/2304.00568: **Interstellar Objects** *by Darryl Z. Seligman, Amaya Moro-Martín*
astro-ph/2304.00576: **Modified Newtonian Dynamics as an Alternative to the Planet Nine Hypothesis** *by Katherine Jones-Smith, Harsh Mathur*
astro-ph/2304.01231: **On a Super-Complete Mathematical Model of Ambipolar Processes of Cumulation and Dissipation in Self-Focusing Structures in Plasma of Planetary Atmospheres in plasma with current** *by Philipp I. Vysikaylo*
astro-ph/2304.01302: **Dynamical Mass of the Young Brown Dwarf Companion PZ Tel B** *by Kyle Franson, Brendan P. Bowler*
astro-ph/2304.01257: **The Hamiltonian for von Zeipel-Lidov-Kozai oscillations** *by Scott Tremaine*
astro-ph/2304.00854: **The X-ray activity of F stars with hot Jupiters: KELT-24 versus WASP-18** *by I. Pillitteri et al.*
astro-ph/2304.00797: **Updated Planetary Mass Constraints of the Young V1298 Tau System Using MAROON-X** *by James Sikora et al.*
astro-ph/2304.01076: **Eight exoplanet candidates in SAO survey** *by O. Ya. Yakovlev et al.*
astro-ph/2304.02045: **The influence of cold Jupiters in the formation of close-in planets. I. planetesimal transport** *by Sergio Best et al.*
astro-ph/2304.02157: **Geometric Solution to the Angles-Only Initial Orbit Determination Problem** *by Michela Mancini et al.*
astro-ph/2304.02139: **Three long period transiting giant planets from TESS** *by Rafael Brahm et al.*
astro-ph/2304.02044: **Accretion of aerodynamically large pebbles** *by Helong Huang, Chris W. Ormel*
astro-ph/2304.01760: **Testing protoplanetary disc evolution with CO fluxes. A proof of concept in Lupus and Upper Sco** *by Francesco Zagaria et al.*
astro-ph/2304.01920: **LHS 475 b: A Venus-sized Planet Orbiting a Nearby M Dwarf** *by Kristo Ment et al.*
astro-ph/2304.01674: **How to form compact & other longer-lived planet-induced vortices: VSI, planet migration, or re-triggers, but not feedback** *by Michael Hammer, Min-Kai Lin*
astro-ph/2304.01570: **Revisiting the Red-giant Branch Hosts KOI-3886 and ι Draconis. Detailed Asteroseismic Modeling and Consolidated Stellar Parameters** *by Tiago L. Campante et al.*
astro-ph/2304.02236: **Identifying and characterizing ultracool dwarfs ejected from post-encounter disintegrating systems** *by Alexandra K. P. Yip et al.*
astro-ph/2304.02466: **G 68-34: A Double-Lined M-Dwarf Eclipsing Binary in a Hierarchical Triple System** *by Emily K Pass, David Charbonneau*

astro-ph/2304.02503: **On the correct computation of all Lyapunov exponents in Hamiltonian dynamical systems** *by Daniel D. Carpintero, J. C. Muzzio*

astro-ph/2304.02634: **Intra-system uniformity: a natural outcome of dynamical sculpting** *by Caleb Lammers et al.*

astro-ph/2304.02698: **The Runaway Greenhouse Effect on Hycean Worlds** *by Hamish Innes et al.*

astro-ph/2304.02779: **Hyades Member K2-136c: The Smallest Planet in an Open Cluster with a Precisely Measured Mass** *by Andrew W. Mayo et al.*

astro-ph/2304.03328: **The PEPSI Exoplanet Transit Survey. III: The detection of FeI, CrI and TiI in the atmosphere of MASCARA-1 b through high-resolution emission spectroscopy** *by G. Scandariato et al.*

astro-ph/2304.02937: **Eccentric Dust Ring in the IRS 48 Transition Disk** *by Haifeng Yang et al.*

astro-ph/2304.02815: **MOA-2022-BLG-249Lb: Nearby microlensing super-Earth planet detected from high-cadence surveys** *by Cheongho Han et al.*

astro-ph/2304.03248: **High-resolution Emission Spectroscopy of the Ultrahot Jupiter KELT-9b: Little Variation in Day- and Nightside Emission Line Contrasts** *by Andrew Ridden-Harper et al.*

astro-ph/2304.03607: **The Disc Miner II: Revealing Gas substructures and Kinematic signatures from Planet-disc interaction through line profile analysis** *by Andres F. Izquierdo et al.*

astro-ph/2304.03619: **Direct Exoplanet Detection Using L1 Norm Low-Rank Approximation** *by Hazan Daglayan et al.*

astro-ph/2304.03665: **Molecules with ALMA at Planet-forming Scales (MAPS). Complex Kinematics in the AS 209 Disk Induced by a Forming Planet and Disk Winds** *by Maria Galloway-Sprietsma et al.*

astro-ph/2304.03700: **A Data Science Approach to Study the Water Storage Capacity in Rocky Planet Mantles: Earth, Mars, and Exoplanets** *by Junjie Dong*

astro-ph/2304.03808: **Elemental Abundances of the Super-Neptune WASP-107b's Host Star Using High-resolution, Near-infrared Spectroscopy** *by Neda Hejazi et al.*

astro-ph/2304.03839: **Characterisation of the upper atmospheres of HAT-P-32 b, WASP-69 b, GJ 1214 b, and WASP-76 b through their He I triplet absorption** *by M. Lampón et al.*

astro-ph/2304.03850: **The infrared colors of 51 Eridani b: micrometereoid dust or chemical disequilibrium?** *by Alexander Madurowicz et al.*

astro-ph/2304.03871: **KMT-2021-BLG-2010Lb, KMT-2022-BLG-0371Lb, and KMT-2022-BLG-1013Lb: Three microlensing planets detected via partially covered signals** *by Cheongho Han et al.*

astro-ph/2304.04285: **The Mantis Network III: Expanding the limits of chemical searches within ultra hot-Jupiters. New detections of Ca I, V I, Ti I, Cr I, Ni I, Sr II, Ba II, and Tb II in KELT-9 b** *by N. W. Borsato et al.*

astro-ph/2304.04866: **Rapid solidification of Earth's magma ocean limits early lunar recession** *by Jun Korenaga*

astro-ph/2304.04829: **Spherical Harmonics for the 1D Radiative Transfer Equation I: Reflected Light** *by Caoimhe M. Rooney et al.*

astro-ph/2304.04807: **Deep-learning based measurement of planetary radial velocities in the presence of stellar variability** *by Ian Colwell et al.*

astro-ph/2304.04730: **TOI-3785 b: A Low-Density Neptune Orbiting an M2-Dwarf Star** *by Luke C. Powers et al.*

astro-ph/2304.04830: **Spherical Harmonics for the 1D Radiative Transfer Equation II: Thermal Emission** *by Caoimhe M. Rooney et al.*

astro-ph/2304.04605: **Prediction of Planet Yields by the PRime-focus Infrared Microlensing Experiment Microlensing Survey** *by Iona Kondo et al.*

astro-ph/2304.04477: **The GAPS programme at TNG XLIII. A massive brown dwarf orbiting the active M dwarf TOI-5375** *by J. Maldonado et al.*

astro-ph/2304.04650: **Wavelength-Dependent Extinction and Grain Sizes in Dippers** *by Michael L. Sitko et al.*

astro-ph/2304.04458: **Reducing roundoff errors in numerical integration of planetary ephemeris** *by Maxim Subbotin et al.*

astro-ph/2304.04948: **Detection of rubidium and samarium in the atmosphere of the ultra-hot Jupiter MASCARA-4b** *by Zewen Jiang et al.*

astro-ph/2304.05579: **Binary asteroid dissociation and accretion around white dwarfs** *by Zeping Jin et al.*

astro-ph/2304.05972: **Gap Opening in Protoplanetary Disks: Gas Dynamics from Global Non-ideal MHD Simulations with Consistent Thermochemistry** *by Xiao Hu et al.*

astro-ph/2304.05954: **A rich hydrocarbon chemistry and high C to O ratio in the inner disk around a very low-mass star** *by B. Tabone et al.*

astro-ph/2304.06074: **Apocenter pile-up and arcs: a narrow dust ring around HD 129590** *by Johan Olofsson et al.*

astro-ph/2304.05773: **Cold Jupiters and improved masses in 38 Kepler and K2 small-planet systems from 3661 high-precision HARPS-N radial velocities. No excess of cold Jupiters in small-planet systems** *by A. S. Bonomo et al.*

astro-ph/2304.05707: **Converting the sub-Jovian desert of exoplanets to a savanna with TESS, PLATO and Ariel** *by Szilárd Kálmán et al.*

astro-ph/2304.05777: **Survey of Orion Disks with ALMA (SODA) II: UV-driven disk mass loss in L1641 and L1647** *by S. E. van Terwisga, A. Hacar*

astro-ph/2304.06314: **A physically derived eddy parameterization for giant planet atmospheres with application on hot-Jupiter atmospheres** *by Anthony Arfaux, Panayotis Lavvas*

astro-ph/2304.06382: **Investigating the asymmetric chemistry in the disk around the young star HD 142527** *by Milou Temmink et al.*

astro-ph/2304.06406: **Revisiting K2-233 spectroscopic time-series with multidimensional Gaussian Processes** *by Oscar Barragán et al.*

astro-ph/2304.06655: **TOI-733 b: a planet in the small-planet radius valley orbiting a Sun-like star** *by Iskra Y. Georgieva et al.*

astro-ph/2304.06851: **Planet Eclipse Mapping with Long-Term Baseline Drifts** *by Everett Schlawin et al.*

astro-ph/2304.07066: **Magnetic winding and turbulence in ultra-hot Jupiters** *by Clàudia Soriano-Guerrero et al.*

astro-ph/2304.07325: **Parallelization of the Symplectic Massive Body Algorithm (SyMBA) N-body Code** *by Tommy Chi Ho Lau, Man Hoi Lee*

astro-ph/2304.07352: **A hydrodynamic study of the escape of metal species and excited hydrogen from the atmosphere of the hot Jupiter WASP-121b** *by Chenliang Huang et al.*

astro-ph/2304.07370: **The apparent absence of forward scattering in the HD 53143 debris disk** *by Christopher C. Stark et al.*

astro-ph/2304.07346: **Three-dimensional magnetic field imaging of protoplanetary disks using Zeeman broadening and linear polarization observations** *by Boy Lankhaar, Richard Teague*

astro-ph/2304.07446: **Evidence for Misalignment Between Debris Disks and Their Host Stars** *by Spencer A. Hurt, Meredith A. MacGregor*

astro-ph/2304.07792: **Observing atmospheric escape in sub-Jovian worlds with JWST** *by Leonardo A. Dos Santos et al.*

astro-ph/2304.07808: **Residual eccentricity of an Earth-like planet orbiting a red giant Sun** *by A. F. Lanza et al.*

astro-ph/2304.07845: **Earth shaped by primordial H_2 atmospheres** *by Edward D. Young et al.*

astro-ph/2304.08518: **Mapping the Skies of Ultracool Worlds: Detecting Storms and Spots with Extremely Large Telescopes** *by Michael K. Plummer, Ji Wang*

astro-ph/2304.08489: **A statistical model of stellar variability. I. FENRIR: a physics-based model of stellar activity, and its fast Gaussian process approximation** *by Nathan C. Hara, Jean-Baptiste Delisle*

astro-ph/2304.08254: **Geoeffectiveness of Interplanetary Shocks Controlled by Impact Angles: Past Research, Recent Advancements, and Future Work** *by Denny M. Oliveira*

astro-ph/2304.08104: **GREX-PLUS Science Book** *by GREX-PLUS Science Team et al.*

astro-ph/2304.09210: **Survival and dynamics of rings of co-orbital planets under perturbations** *by Sean N. Raymond et al.*

astro-ph/2304.09220: **Two super-Earths at the edge of the habitable zone of the nearby M dwarf TOI-2095** *by F. Murgas et al.*

astro-ph/2304.09209: **Constellations of co-orbital planets: horseshoe dynamics, long-term stability, transit timing variations, and potential as SETI beacons** *by Sean N. Raymond et al.*

astro-ph/2304.09189: **Two Warm Super-Earths Transiting the Nearby M Dwarf TOI-2095** *by Elisa V. Quintana et al.*

astro-ph/2304.08690: **Surface pressure impact on nitrogen-dominated USP super-Earth atmospheres** *by Jamila Chouqar et al.*

astro-ph/2304.09038: **Secular orbital dynamics of the innermost exoplanet of the υ-Andromedæ system** *by Rita Mastroianni, Ugo Locatelli*

astro-ph/2304.08771: **MHD study of extreme space weather conditions for exoplanets with Earth-like magnetospheres: On habitability conditions and radio-emission** *by J. Varela et al.*

astro-ph/2304.09204: **The quest for Magrathea planets I: formation of second generation exoplanets around double white dwarfs** *by S. Ledda et al.*

astro-ph/2304.09642: **The magnetic field and multiple planets of the young dwarf AU Mic** *by J. -F. Donati et al.*

astro-ph/2304.09882: **Giant planet engulfment by evolved giant stars: light curves, asteroseismology, and survivability** *by Christopher E. O'Connor et al.*

astro-ph/2304.09890: **Exoplanet Nodal Precession Induced by Rapidly Rotating Stars: Impacts on Transit Probabilities and Biases** *by Alexander P. Stephan, B. Scott Gaudi*

astro-ph/2304.09896: **Constraints on Magnetic Braking from the G8 Dwarf Stars 61 UMa and τ Cet** *by Travis S. Metcalfe et al.*

astro-ph/2304.10303: **Avoiding methane emission rate underestimates when using the divergence method** *by Clayton Roberts et al.*

astro-ph/2304.11236: **Constraining the Origin of Mars via Simulations of Multi-Stage Core Formation** *by Gabriel Nathan et al.*

astro-ph/2304.10683: **There's more to life than O_2: Simulating the detectability of a range of molecules for ground-based high-resolution spectroscopy of transiting terrestrial exoplanets** *by Miles H. Currie et al.*

astro-ph/2304.11022: **Exploring the stellar surface phenomena of WASP-52 and HAT-P-30 with ESPRESSO** *by H. M. Cegla et al.*

astro-ph/2304.11570: **Prospects for the characterization of habitable planets** *by S. Mazevet et al.*

astro-ph/2304.11627: **Lorenz Energy Cycle: Another Way to Understand the Atmospheric Circulation on Tidally Locked Terrestrial Planets** *by Shuang Wang, Jun Yang*

astro-ph/2304.11769: **GJ3470-d and GJ3470-e: Discovery of Co-Orbiting Exoplanets in a Horseshoe Exchange Orbit** *by Phillip Scott et al.*

astro-ph/2304.12490: **Bioverse: A Comprehensive Assessment of the Capabilities of Extremely Large Telescopes to Probe Earth-like O_2 Levels in Nearby Transiting Habitable Zone Exoplanets** *by Kevin K. Hardegree-Ullman et al.*

astro-ph/2304.12442: **Enabling Exoplanet Demographics Studies with Standardized Exoplanet Survey Meta-Data** *by the ExoPAG Science Interest Group et al.*

astro-ph/2304.12380: **Population study on MHD wind-driven disc evolution – Confronting theory and observation** *by Jesse Weder et al.*

astro-ph/2304.12366: **Steeper Scattered Disks Buckle Faster** *by Alexander Zderic, Ann-Marie Madigan*

astro-ph/2304.12352: **Orbital Architectures of Kepler Multis From Planet-Planet Scattering** *by Tuhin Ghosh, Sourav Chatterjee*

astro-ph/2304.12048: **New compound and hybrid binding energy sputter model for modeling purposes in agreement with experimental data** *by Noah Jaeggi et al.*

astro-ph/2304.12197: **The Gaia-ESO Survey: Empirical estimates of stellar ages from lithium equivalent widths (EAGLES)** *by R. D. Jeffries et al.*

astro-ph/2304.12163: **WASP-131 b with ESPRESSO I: A bloated sub-Saturn on a polar orbit around a differentially rotating solar-type star** *by L. Doyle et al.*

astro-ph/2304.11994: **Detection of carbon monoxide's 4.6 micron fundamental band structure in WASP-39b's atmosphere with JWST NIRSpec G395H** *by David Grant et al.*

astro-ph/2304.11898: **Tidal dissipation in stratified and semi-convective regions of giant planets** *by Christina M. Pontin et al.*

astro-ph/2304.12337: **Inner edges of planetesimal belts: collisionally eroded or truncated?** *by Amaia Imaz Blanco et al.*

astro-ph/2304.12705: **The shared evaporation history of three sub-Neptunes spanning the radius-period valley of a Hyades star** *by Jorge Fernández Fernández et al.*

astro-ph/2304.12758: **Giants are bullies: how their growth influences systems of inner sub-Neptunes and super-Earths** *by Bertram Bitsch, Andre Izidoro*

astro-ph/2304.12782: **Warm giant exoplanet characterisation: current state, challenges and outlook** *by Simon Müller, Ravit Helled*

astro-ph/2304.12788: **The interplay between pebble and planetesimal accretion in population synthesis models and its role in giant planet formation** *by Andrin Kessler, Yann Alibert*

astro-ph/2304.13843: **Removing Aliases in Time-Series Photometry** *by Daniel Kramer et al.*

astro-ph/2304.13759: **Combined analysis of stellar and planetary absorption lines via global forward-transit simulations** *by William Dethier, Vincent Bourrier*

astro-ph/2304.13753: **Debris Rings from Extrasolar Irregular Satellites** *by Kevin T. Hayakawa, Bradley M. S. Hansen*

astro-ph/2304.13659: **Narrow loophole for H2-dominated atmospheres on habitable rocky planets around M dwarfs** *by Renyu Hu et al.*

astro-ph/2304.13414: **FU Orionis disk outburst: evidence for a gravitational instability scenario triggered in a magnetically dead zone** *by G. Bourdarot et al.*

astro-ph/2304.13381: **Gaussian processes for radial velocity modeling Better rotation periods and planetary parameters with the quasi-periodic kernel and constrained priors** *by Stephan Stock et al.*

astro-ph/2304.13316: **Simulations of Protoplanetary Disk Dispersal: Stellar Mass Dependence of the Disk Lifetime** *by A. Komaki et al.*

astro-ph/2304.13271: **Impact of turbulence intensity and fragmentation velocity on dust particle size evolution and non-ideal magnetohydrodynamics effects** *by Yoshihiro Kawasaki, Masahiro N. Machida*

astro-ph/2304.13598: **The invasion of a free floating planet and the number asymmetry of Jupiter Trojans** *by Jian Li et al.*

astro-ph/2304.14478: **A von Mises-Fisher Distribution for the Orbital Poles of the Plutinos** *by Ian C. Matheson et al.*

astro-ph/2304.14452: **Mind the Gap I: Hα Activity of M Dwarfs Near the Partially/Fully Convective Boundary and a New Hα Emission Deficiency Zone on the Main Sequence** *by Wei-Chun Jao et al.*

astro-ph/2304.14450: **Observations of planet forming disks in multiple stellar systems** *by Alice Zurlo et al.*

astro-ph/2304.14193: **High-contrast detection of exoplanets with a kernel-nuller at the VLTI** *by Peter Marley Chingaipe et al.*

astro-ph/2304.14192: **Thermal Tomography of the Inner Regions of Protoplanetary Disks with the ngVLA and ALMA** *by Satoshi Okuzumi et al.*

astro-ph/2304.14063: **Applying a temporal systematics model to vector Apodizing Phase Plate coronagraphic data: TRAP4vAPP** *by Pengyu Liu et al.*

astro-ph/2304.14283: **Distinguishing a planetary transit from false positives: a Transformer-based classification for planetary transit signals** *by Helem Salinas et al.*

astro-ph/2304.14677: **Systematics of planetary ephemeris reference frames inferred from pulsar timing as-**

trometry *by Niu Liu et al.*

astro-ph/2304.14703: **The mass determination of TOI-519 b: a close-in giant planet transiting a metal-rich mid-M dwarf** *by Taiki Kagetani et al.*

astro-ph/2304.14794: **Cyclic Variability in Brightness of the Young Solar Analog BE Ceti** *by N. I. Bondar', M. M. Katsova*

astro-ph/2304.15002: **Gas distribution in ODISEA sources from ALMA long-baseline observations in ^{12}CO(2-1)** *by Juanita Antilen et al.*