ExoPlanet News
An Electronic Newsletter

No. 172, 10 October 2023

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

Contents

1 Editorial

Welcome to Edition 172 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 (`http://nccr-planets.ch/exoplanetnews/`).

The next issue will appear on November 14, 2023.

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

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

2 Abstracts of refereed papers

Constraining the reflective properties of WASP-178 b using CHEOPS photometry.

I. Pagano[1], G. Scandariato[1], V. Singh[1], M. Lendl[2], D. Queloz[3,4], A. E. Simon[5], S. G. Sousa[6], A. Brandeker[7], A. Collier Cameron[8], S. Sulis[9], V. Van Grootel[10], T. G. Wilson[8], and the CHEOPS collaboration (a complete list of authors can be found on the publication)

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A&A, in press (arXiv:2309.09037)

Multiwavelength photometry of the secondary eclipses of extrasolar planets is able to disentangle the reflected and thermally emitted light radiated from the planetary dayside. This leads to the measurement of the planetary geometric albedo A_g, which is an indicator of the presence of clouds in the atmosphere, and the recirculation efficiency ϵ, which quantifies the energy transport within the atmosphere.
In this work we aim to measure A_g and ϵ for the planet WASP-178 b, a highly irradiated giant planet with an estimated equilibrium temperature of 2450 K.
We analyzed archival spectra and the light curves collected by CHEOPS and TESS to characterize the host WASP-178, refine the ephemeris of the system and measure the eclipse depth in the passbands of the two respective telescopes. We measured a marginally significant eclipse depth of 70$\pm$40 ppm in the TESS passband and statistically significant depth of 70$\pm$20 ppm in the CHEOPS passband.
Combining the eclipse depth measurement in the CHEOPS ($\lambda_{\rm eff} = 6300$ Å) and TESS ($\lambda_{\rm eff} = 8000$ Å) passbands we constrained the dayside brightness temperature of WASP-178 b in the 2250-2800 K interval. The geometric albedo $0.1< \mathrm{A_g} <0.35$ is in general agreement with the picture of poorly reflective giant planets, while the recirculation efficiency $\epsilon >0.7$ makes WASP-178 b an interesting laboratory to test the current heat recirculation models.

Download/Website: `http://arxiv.org/abs/2309.09037`

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GJ 9404 b: a confirmed eccentric planet, and not a candidate

Thomas A. Baycroft, Harry Badnell, Samuel Blacker, Amaury H.M.J Triaud
School of Physics & Astronomy, University of Birmingham, Edgbaston, Birmingham B15 2TT, United Kingdom

Research Notes of the AAS, published (2023RNAAS...7..175B)

Eccentric orbits can be decomposed into a series of sine curves which affects how the false alarm probability is computed when using traditional periodograms on radial-velocity data. Here we show that a candidate exoplanet orbiting the M dwarf GJ 9404, identified by the HADES survey using data from the HARPS-N spectrograph, is in fact a bona-fide planet on a highly eccentric orbit. Far from a candidate, GJ 9404 b is detected with a high confidence. We reach our conclusion using two methods that assume Keplerian functions rather than sines to compute a detection probability, a Bayes Factor, and the FIP periodogram. We compute these using nested sampling with `kima`.

Parameters	Units	Values
$M_\star$	$\mathrm{M}_\odot$	0.62 ± 0.07
P	days	$13.4586^{+0.0044}_{-0.0067}$
$K_\star$	$\mathrm{m\,s^{-1}}$	$5.13^{+1.04}_{-0.85}$
e		$0.49^{+0.11}_{-0.13}$
T_per	BJD	$2\,457\,095.30^{+0.59}_{-0.38}$
ω	rad	1.90 ± 0.33
$m_\mathrm{p} \sin i_\mathrm{p}$	$\mathrm{M}_\oplus$	11.9 ± 1.9
a_p	AU	0.0943 ± 0.0036
σ_jit	$\mathrm{m\,s^{-1}}$	$2.27^{+0.40}_{-0.42}$

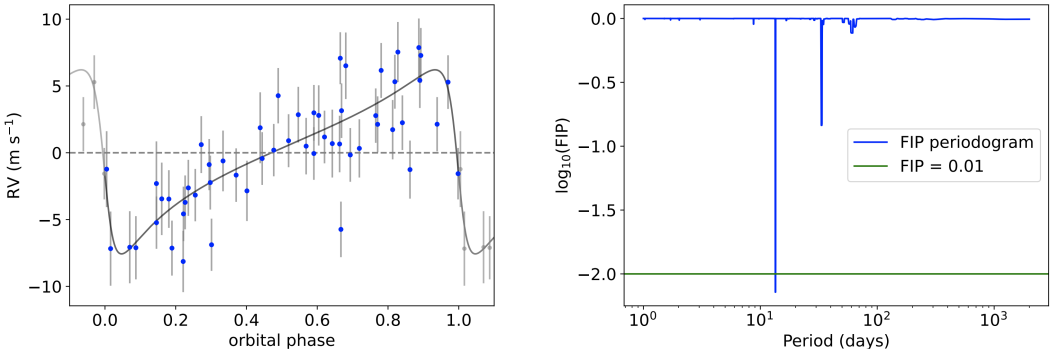

Figure 1: Top: Median values and 1σ uncertainties for the parameters of GJ9404b from `kima`. Bottom left: phase plot of best-fitting planetary solution. Bottom right: in blue the false-inclusion probability (FIP) periodogram, in green the threshold at which the false-incusion probability is 0.01.

Download/Website: `https://iopscience.iop.org/article/10.3847/2515-5172/acefc5`
Contact: `txb187@bham.ac.uk`

New evidence about HW Vir's circumbinary planets from *Hipparcos-Gaia* astrometry and a reanalysis of the eclipse timing variations using nested sampling

Thomas A. Baycroft[1], *Amaury H.M.J. Triaud*[1], *Pierre Kervella* [2]

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Monthly Notices of the Royal Astronomical Society, published (2023MNRAS.tmp.2674B/arXiv:2309.05716)

The post common-envelope eclipsing binary HW Virginis has had many circumbinary companions proposed based on eclipse timing variations. Each proposed solution has lacked in predictability and orbital stability, leaving the origin of the eclipse timing variations an active area of research. Leveraging the catalogue of *Hipparcos* and *Gaia* proper motion anomalies, we show there is slight evidence for a circumbinary companion orbiting HW Vir. We place an upper limit in mass for such a companion which excludes some previously claimed companions. We also apply this method to V471 Tauri and confirm the non-detection of a previously claimed brown dwarf. We adapt the `kima` nested sampling code to analyse eclipse timing variations and re-analyse archival data on HW Vir, varying the order of the ephemeris that we fit for and the amount of the data that we use. Although signals are clearly present, we find two signals around 2500 and 4000 day periods that are not coherent between different *chunks* of the data, so are likely to not be of planetary origin. We analyse the whole dataset and find the best solution to contain four signals. Of these four we argue the outermost is the most compatible with astrometry and thus the most likely to be of planetary nature. We posit the other three pseudo-periodic signals are caused by physical processes on the white dwarf. The eventual release of the full *Gaia* epoch astrometry is a promising way to confirm whether circumbinary planets exist around HW Vir (and other similar systems), and explore white dwarf physics.

Download/Website: `https://arxiv.org/abs/2309.05716`

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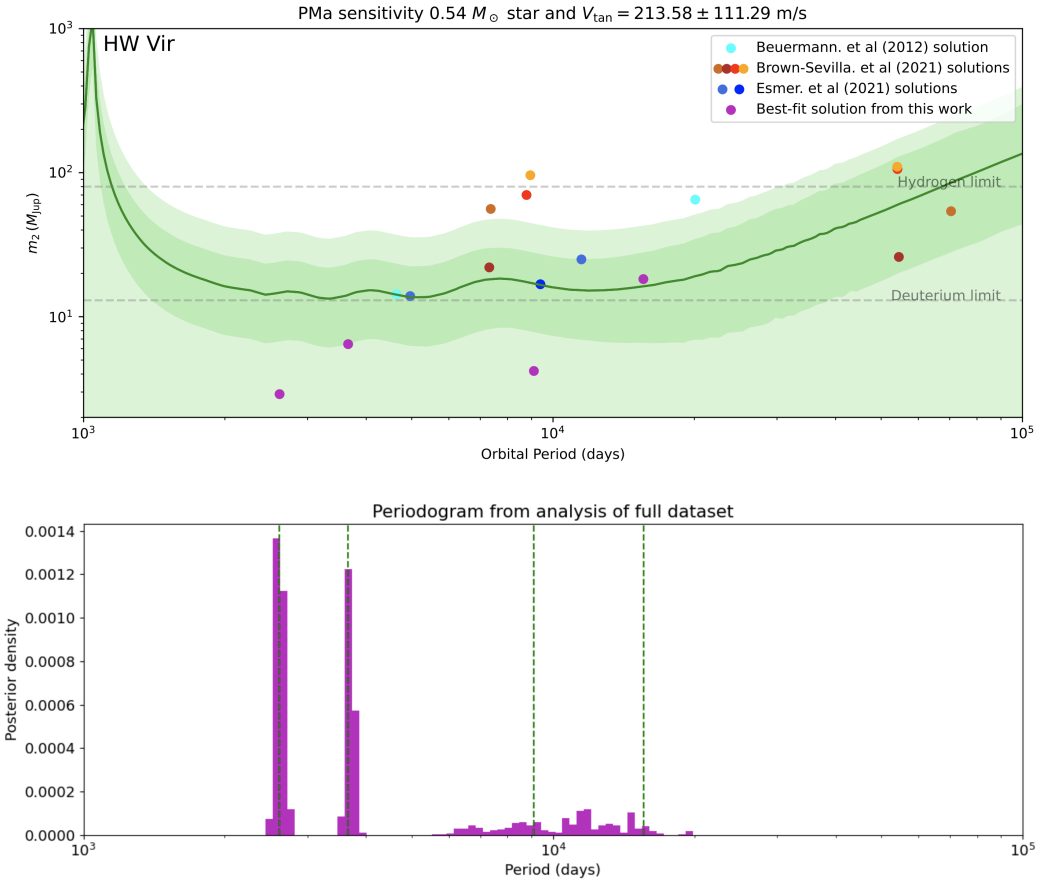

Figure 2: Top: Sensitivity curve for proper motion anomaly applied to HW Vir. Green shows the mean, 1-σ region and 3-σ region of parameter space that could correspond to an orbiting body giving rise to the proper motion anomaly. The coloured dots show locations of claimed solutions by 3 previous analyses as well as the best-fitting solution from this work. The dashed lines show the locations of the hydrogen and deuterium fusing limits. Middle: posterior density histogram of the periods of planets suggested in all Np=4 posterior samples from the analysis of the full dataset. Dashed lines show the locations of the best fitting 4-planet solution.

A direct $N-$body integrator for modelling the chaotic, tidal dynamics of multibody extrasolar systems: TIDYMESS

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Monthly Notices of the Royal Astronomical Society, published (2023MNRAS.522.2885B)

Tidal dissipation plays an important role in the dynamical evolution of moons, planets, stars, and compact remnants. The interesting complexity originates from the interplay between the internal structure and external tidal forcing. Recent and upcoming observing missions of exoplanets and stars in the galaxy help to provide constraints on the physics of tidal dissipation. It is timely to develop new N-body codes, which allow for experimentation with various tidal models and numerical implementations. We present the open-source N-body code TIDYMESS, which stands for 'TIdal DYnamics of Multibody ExtraSolar Systems'. This code implements a Creep deformation law for the bodies, parametrized by their fluid Love numbers and fluid relaxation times. Due to tidal and centrifugal deformations, we approximate the general shape of a body to be an ellipsoid. We calculate the associated gravitational field to quadruple order, from which we derive the gravitational accelerations and torques. The equations of motion for the orbits, spins and deformations are integrated directly using a fourth-order integration method based on a symplectic composition. We implement a novel integration method for the deformations, which allows for a time-step solely dependent on the orbits, and not on the spin periods or fluid relaxation times. This feature greatly speeds up the calculations, while also improving the consistency when comparing different tidal regimes. We demonstrate the capabilities and performance of TIDYMESS, particularly in the niche regime of parameter space where orbits are chaotic and tides become non-linear.

Download/Website: `https://arxiv.org/abs/2209.03955`

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The dynamical evolution of protoplanetary disks and planets in dense star clusters

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Monthly Notices of the Royal Astronomical society, published (2023MNRAS.tmp.2714F)

Most stars are born in dense stellar environments where the formation and early evolution of planetary systems may be significantly perturbed by encounters with neighbouring stars.
To investigate on the fate of circumstellar gas disks and planets around young stars dense stellar environments, we numerically evolve star-disk-planet systems. We use the N-body codes `NBODY6++GPU` and `SnIPES` for the dynamical evolution of the stellar population, and the `SPH`-based code `GaSPH` for the dynamical evolution of protoplanetary disks.
The secular evolution of a planetary system in a cluster differs from that of a field star. Most stellar encounters are tidal, adiabatic and nearly-parabolic. The parameters that characterize the impact of an encounter include the orientation of the protoplanetary disk and planet relative to the orbit of the encountering star, and the orbital phase and the semi-major axis of the planet. We investigate this dependence for close encounters ($r_p/a \leq 100$, where r_p is the periastron distance of the encountering star and a is the semi-major axis of the planet). We also investigate distant perturbers ($r_p/a \gg 100$), which have a moderate effect on the dynamical evolution of the planet and the protoplanetary disk. We find that the evolution of protoplanetary disks in star clusters differs significantly from that of isolated systems. When interpreting the outcome of the planet formation process, it is thus important to consider their birth environments.

Download/Website: `https://academic.oup.com/mnras/article/526/2/1987/7276614`

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Small body harvest with the Antarctic Search for Transiting Exoplanets (ASTEP) project

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Monthly Notices of the Royal Astronomical Society, in press (arXiv:2309.14180)

Small Solar system bodies serve as pristine records that have been minimally altered since their formation. Their observations provide valuable information regarding the formation and evolution of our Solar system. Interstellar objects (ISOs) can also provide insight on the formation of exoplanetary systems and planetary system evolution as a whole. In this work, we present the application of our framework to search for small Solar system bodies in exoplanet transit survey data collected by the Antarctic Search for Transiting ExoPlanets (ASTEP) project. We analysed data collected during the Austral winter of 2021 by the ASTEP 400 telescope located at the Concordia Station, at Dome C, Antarctica. We identified 20 known objects from dynamical classes ranging from Inner Main-belt asteroids to one comet. Our search recovered known objects down to a magnitude of V = 20.4 mag, with a retrieval rate of $\sim$80% for objects with $V \leq 20$ mag. Future work will apply the pipeline to archival ASTEP data that observed fields for periods of longer than a few hours to treat them as deep-drilling datasets and reach fainter limiting magnitudes for slow-moving objects, on the order of $V \approx$ 23-24 mag.

Download/Website: `https://doi.org/10.48550/arXiv.2309.14180`
Contact: `shasler@mit.edu`

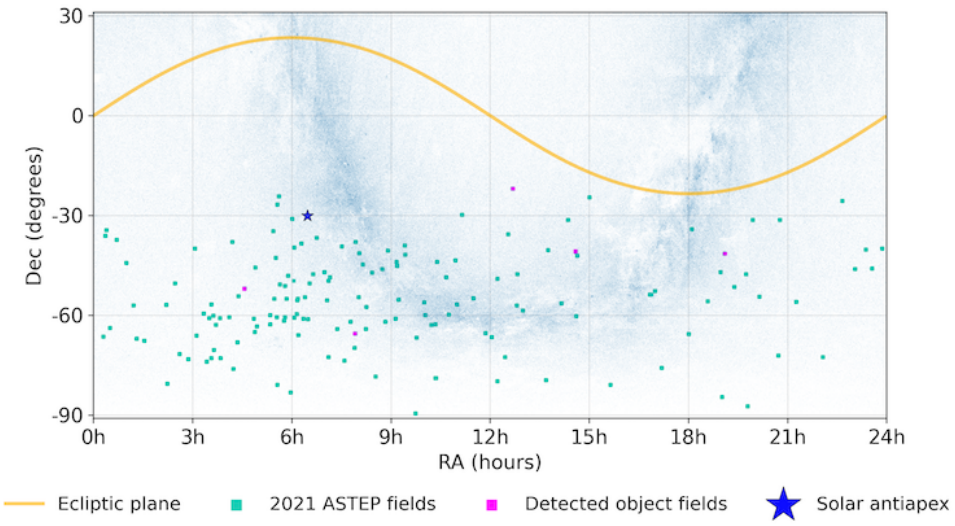

Figure 3: Projection of the celestial sphere with stars (blue dots) from the Tycho-2 catalog, the ecliptic plane (orange line), the solar antiapex (blue star), and the processed ASTEP fields (teal squares) over-plotted. Fields with detections of known objects are also shown in magenta. The size of the markers depicts the size of ASTEP's field of view.

Sandwiched planet formation: restricting the mass of a middle planet

Matthew Pritchard[1,2], *Farzana Meru*[1,2], *Sahl Rowther*[1,2,3], *David Armstrong*[1,2], *Kaleb Randall*[1,2]

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Monthly Notices of the Royal Astronomical Society, in press (arXiv:2310.01488)

Monthly Notices of the Royal Astronomical SocietyMonthly Notices of the Royal Astronomical Society We conduct gas and dust hydrodynamical simulations of protoplanetary discs with one and two embedded planets to determine the impact that a second planet located further out in the disc has on the potential for subsequent planet formation in the region locally exterior to the inner planet. We show how the presence of a second planet has a strong influence on the collection of solid material near the inner planet, particularly when the outer planet is massive enough to generate a maximum in the disc's pressure profile. This effect in general acts to reduce the amount of material that can collect in a pressure bump generated by the inner planet. When viewing the inner pressure bump as a location for potential subsequent planet formation of a third planet, we therefore expect that the mass of such a planet will be smaller than it would be in the case without the outer planet, resulting in a small planet being sandwiched between its neighbours - this is in contrast to the expected trend of increasing planet mass with radial distance from the host star. We show that several planetary systems have been observed that do not show this trend but instead have a smaller planet sandwiched in between two more massive planets. We present the idea that such an architecture could be the result of the subsequent formation of a middle planet after its two neighbours formed at some earlier stage.

Download/Website: `https://arxiv.org/abs/2310.01488`

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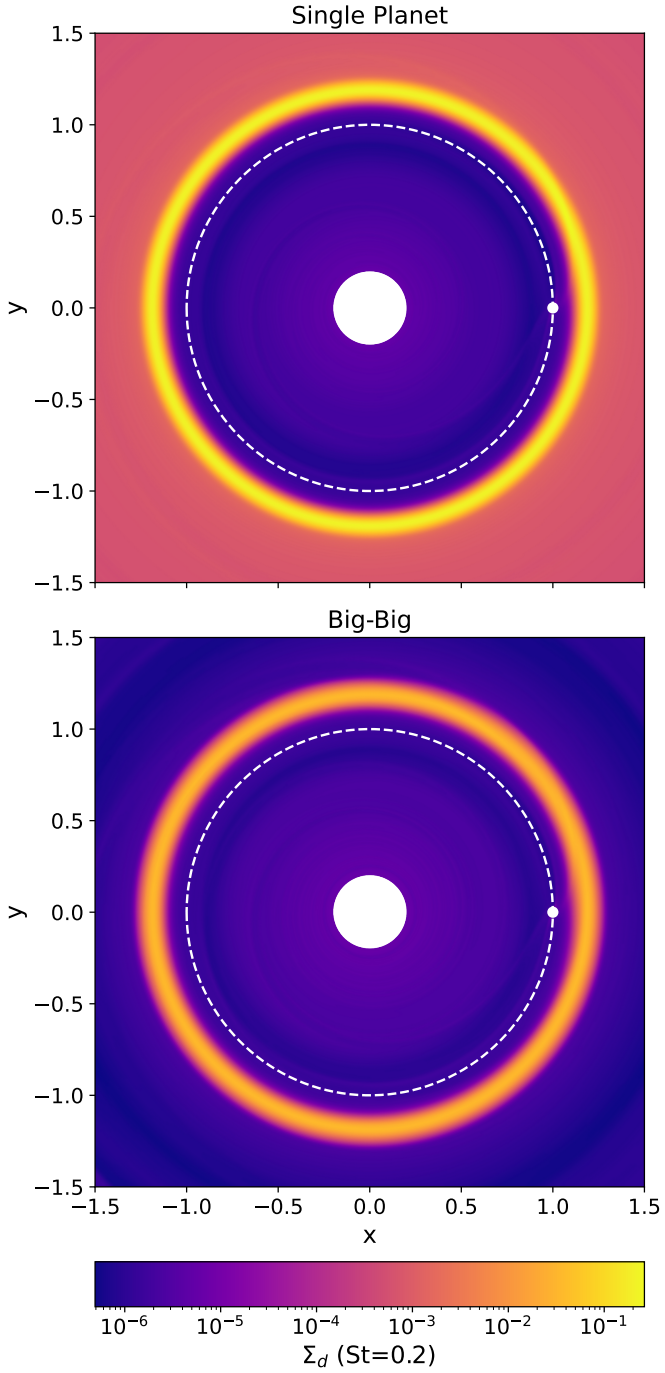

Figure 4: 2D plot of the $\mathrm{St} = 0.2$ dust density for the single $20M_\oplus$ and the two-planet $20M_\oplus$&$35M_\oplus$ simulations showing only the inner part of the discs simulated. The inner planet's position is indicated with a white circle, its orbit by the white dotted line. The high density ring exterior to the inner planet's orbit is a potential location for planet formation. In the two-planet case the density in this ring is notably reduced, limiting the mass of any compact bodies that may form here. This can potentially lead to the 'sandwiched planet architecture' whereby a small planet forms in between two more massive ones. This sandwiched planet architecture is also seen in exoplanet observations.

Atmospheric Retrieval of L Dwarfs: Benchmarking Results and Characterizing the Young Planetary Mass Companion HD 106906 b in the Near-Infrared

Arthur D. Adams[1,2]*, Michael R. Meyer*[2]*, Alex R. Howe*[3]*, Ben Burningham*[4]*, Sebastian Daemgen*[5]*, Jonathan Fortney*[6]*, Mike Line*[7]*, Mark Marley*[8]*, Sascha P. Quanz*[9]*, Kamen Todorov*[5]

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The Astronomical Journal, accepted for publication (arXiv: 2309.10188)

We present model constraints on the atmospheric structure of HD 106906 b, a planetary-mass companion orbiting at a ∼700 AU projected separation around a 15 Myr-old stellar binary, using the APOLLO retrieval code on spectral data spanning 1.1–2.5 μm. C/O ratios can provide evidence for companion formation pathways, as such pathways are ambiguous both at wide separations and at star-to-companion mass ratios in the overlap between the distributions of planets and brown dwarfs. We benchmark our code against an existing retrieval of the field L dwarf 2M2224-0158, returning a C/O ratio consistent with previous fits to the same $JHK_{\rm s}$ data, but disagreeing in the thermal structure, cloud properties, and atmospheric scale height. For HD 106906 b, we retrieve C/O $= 0.53^{+0.15}_{-0.25}$, consistent with the C/O ratios expected for HD 106906's stellar association and therefore consistent with a stellar-like formation for the companion. We find abundances of H_2O and CO near chemical equilibrium values for a solar metallicity, but a surface gravity lower than expected, as well as a thermal profile with sharp transitions in the temperature gradient. Despite high signal-to-noise and spectral resolution, more accurate constraints necessitate data across a broader wavelength range. This work serves as preparation for subsequent retrievals in the era of *JWST*, as *JWST*'s spectral range provides a promising opportunity to resolve difficulties in fitting low-gravity L dwarfs, and also underscores the need for simultaneous comparative retrievals on L dwarf companions with multiple retrieval codes.

Download/Website: `https://arxiv.org/abs/2309.10188`

Contact: `arthura@ucr.edu`

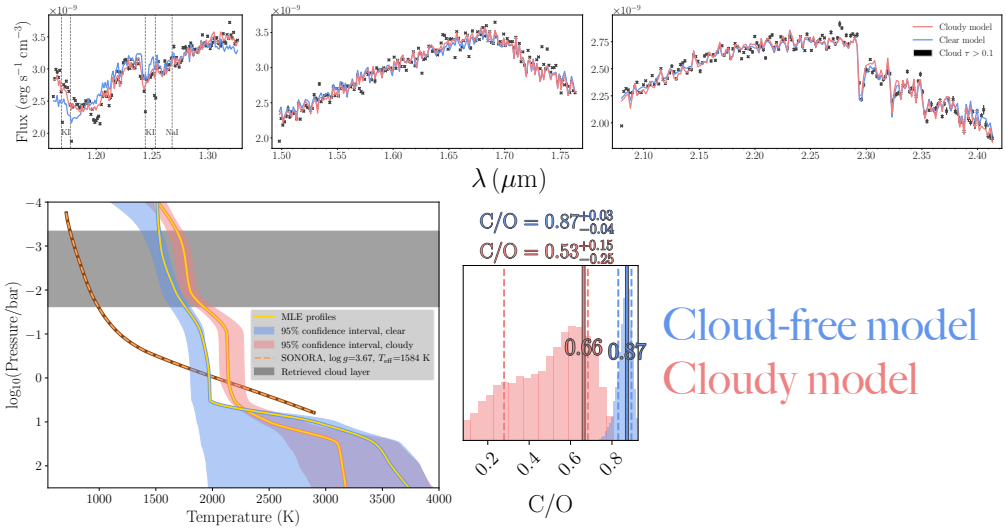
Flux (erg s^{-1} cm^{-3})
λ (μm)
Cloudy model
Clear model
Cloud $\tau > 0.1$
KI
KI
NaI
log$_{10}$(Pressure/bar)
Temperature (K)
MLE profiles
95% confidence interval, clear
95% confidence interval, cloudy
SONORA, log g=3.67, $T_{\rm eff}$=1584 K
Retrieved cloud layer
C/O = $0.87^{+0.03}_{-0.04}$
C/O = $0.53^{+0.15}_{-0.25}$
0.66
0.87
C/O
Cloud-free model
Cloudy model

Figure 5

3 Jobs and Positions

Two Lecturer (Assistant Professor) positions in Physics

University of Dundee, Scotland, UK, Deadline: 23 October 2023

While the primary focus of these positions is on energy and sustainability, we are keen on integrating diverse perspectives. We encourage applications from researchers whose expertise in astrophysics can potentially provide invaluable insights into these areas.

Job description and summary

We wish to recruit two Lecturers in Physics (Physical Sciences) within the School of Science and Engineering at the University of Dundee. We invite candidates with strong and developing track records in research and teaching. Candidates should have a clear plan that articulates with and enhances our existing activities, in particular our BSc and MSci Programmes in Physics with Renewable Energy Science (the first of their kind in the UK). They will be expected to contribute to research and innovation through collaborative projects, secure appropriate funding, engage in knowledge-exchange activities and publish high-quality research outputs. We encourage applications from candidates with interests in energy and sustainability including but not limited to: renewable energy, energy materials, fusion, sustainable fission technologies, energy harvesting, energy storage, computational modelling and space weather. The positions will also articulate with University of Dundee's newly formed Binks Sustainability Institute.

Who we're looking for:

- PhD in Physics, Physical Chemistry, or a closely related subject.
- Clear evidence of learning and teaching competence, commensurate with the role applied for and your career to date.
- Evidence of research of internationally excellent quality, including securing external research funding, commensurate with the role applied for.
- Ambitious research plans that are aligned to the School's research strategy and will be competitive for UK or international funding streams, and/or for industrial funding mechanisms.
- Excellent communication and interpersonal skills as well as evidence of ability and willingness to work collaboratively with others.

Closing date: 23rd October (Interviews are anticipated to be on 6-7 November).

Your application must be submitted electronically via this link. You are also welcomed to contact us for informal enquiries. Further details on the role can be found in the Job Description available via the web link.

The diversity of our staff and students helps to make the University of Dundee a UK university of choice for undergraduate, postgraduate and distance learning. Family friendly policies, staff networks for BME, Disabled and LGBT staff, membership of Athena Swan, the ECU Race Equality Charter and Stonewall as well a full range of disability services, create an enjoyable and inclusive place to work. We welcome applicants with unconventional career paths, and time taken in career breaks or part-time work due to maternity/paternity leave, caring duties, or health reasons will be accounted for in the selection process.

Download/Website: Link to the full advert here.

Contact: `Professor David Keeble: d.j.keeble@dundee.ac.uk`

2024 Trottier Postdoctoral Fellowship in Exoplanetary Science

Prof. René Doyon

Montréal, Canada, Starting date: May to September 2024

The Trottier Institute for Research on Exoplanets (iREx), affiliated with the Department of Physics of the Université de Montréal (UdeM), invites applications for the Trottier Postdoctoral Fellowship in experimental, observational or theoretical astrophysics applied to the study of exoplanets, which enables forefront independent research related to exoplanets. All areas of exoplanet research will be considered.

A PhD in physics, astronomy or related discipline is required at the time when the position starts. Preference will be given to applicants within 3 years of obtaining their PhD. Applicants with career interruptions due to parental, medical or family leaves, or other causes are invited to mention it in their cover letter, if so desired. The position start date is between **May and September 2024**, and is for two years, renewable for a third year subject to performance and availability of funds.

Applicants should submit a cover letter (optional, max 1 page), a CV, a list of publications, and a statement of research interests (max 2 pages), and should arrange to have three referees send a letter of reference to **irex-applications@umontreal.ca by December 2nd 2023 for full consideration**. This position will, however, remain open until filled.

The iREx consists of a growing team of about 60 people working on a variety of observational, theoretical and instrumental projects related to the study of exoplanets and other related fields of astrophysics. They work within several research institutions located in Quebec, Canada. Our team is actively involved in large international projects related to the detection and characterisation of exoplanets, notably the JWST and the SPIRou and NIRPS spectrographs, and have privileged access to time and data from these instruments.

The iREx advocates for diversity, inclusion and employment equity. We strongly encourage applications from women, visible and ethnic minorities, Indigenous people, persons with disabilities and people of all sexual orientations and gender identities to apply.

More information on the position and on our institute and its members, our research programs, our EPO initiatives and our EDI efforts can be found on our website: http://www.exoplanetes.umontreal.ca/?lang=en

Download/Website: `https://bit.ly/iRExTrottierPostdoc\`

Contact: `irex-applications@umontreal.ca`

4 Exoplanet Archives

October 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, October 8, 2023

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

September 21, 2023

Nine Planets, Including JWST's First Confirmed Planet

This week's nine new planets include LHS 475 b, a planet almost the exact same size as Earth and also the first planet to be confirmed by NASA's James Webb Space Telescope. Check out the archive's System Overview page, the discovery paper, and NASA's media release.

The remaining eight new planets added this week are 75 Cet c, HD 99492 c, HIP 113103 b & c, TOI-1853 b, TOI-4201 b, and TOI-4600 b & c.

We've also added new transmission/emission spectra for nine planets to our new Atmospheric Spectroscopy Table. (Have you had a chance to use this new service? Let us know what you think!)

September 7, 2023

Thirteen Planets, Seventeen Spectra

This week we have added 13 new planets to the NASA Exoplanet Archive, spanning a range of sizes and detection techniques.

The new planets are HD 73256 c, HD 75302 b, HD 108202 b, HD 135625 b, HD 185283 b, TOI-332 b, GJ 9404 b, HIP 29442 b, c, & d, KMT-2021-BLG-2010L b, KMT-2022-BLG-0371L b, and KMT-2022-BLG-1013L b. This week's update brings the archive's total planet count to **5,514**.

We have also added seventeen new atmospheric spectra, including both transmission and emission spectroscopy to our Atmospheric Spectroscopy Table. These spectra are for WASP-127 b, WASP-79 b, WASP-62 b, CoRoT-1 b, HD 189733 b, TrES-3 b, WASP-4 b, WASP-12 b, HAT-P-7 b, HAT-P-32 b, HAT-P-41 b, HD 209458 b, KELT-1 b, WASP-117 b, Kepler-138 d, and KELT-9 b.

Finally, please check out the NASA news item on our recent NASA Exoplanet Archive milestone: Discovery Alert: With Six New Worlds, 5,500 Discovery Milestone Passed!

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 September 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.

September 2023

astro-ph/2309.00036: **Detection of Carbon Monoxide in the Atmosphere of WASP-39b Applying Standard Cross-Correlation Techniques to JWST NIRSpec G395H Data** *by Emma Esparza-Borges et al.*

astro-ph/2309.00324: **The space weather around the exoplanet GJ 436 b. II. Stellar wind-exoplanet interactions** *by A. A. Vidotto et al.*

astro-ph/2309.00725: **Visible extreme adaptive optics on extremely large telescopes: Towards detecting oxygen in Proxima Centauri b and analogs** *by J. Fowler et al.*

astro-ph/2309.00695: **Delivery of icy planetesimals to inner planets in the Proxima Centauri planetary system** *by S. I. Ipatov*

astro-ph/2309.00573: **Photodissociation and induced chemical asymmetries on ultra-hot gas giants. A case study of HCN on WASP-76 b** *by Robin Baeyens et al.*

astro-ph/2309.00509: **Enriching inner discs and giant planets with heavy elements** *by Bertram Bitsch, Jingyi Mah*

astro-ph/2309.00492: **Stable Orbits in the Feeding Zone of the Planet Proxima Centauri c** *by S. I. Ipatov*

astro-ph/2309.01280: **KMT-2021-BLG-1547Lb: Giant microlensing planet detected through a signal deformed by source binarity** *by Cheongho Han et al.*

astro-ph/2309.01477: **Towards Measuring Microlensing Event Rate in the Galactic Center: I. Events Detection from the UKIRT Microlensing Survey Data** *by Yongxin Wen et al.*

astro-ph/2309.01464: **A super-massive Neptune-sized planet** *by L. Naponiello et al.*

astro-ph/2309.02495: **Dark Matter (H)eats Young Planets** *by Djuna Croon, Juri Smirnov*

astro-ph/2309.02488: **ELemental abundances of Planets and brown dwarfs Imaged around Stars (ELPIS): I. Potential Metal Enrichment of the Exoplanet AF Lep b and a Novel Retrieval Approach for Cloudy Self-luminous Atmospheres** *by Zhoujian Zhang et al.*

astro-ph/2309.02337: **FastChem Cond: Equilibrium chemistry with condensation and rainout for cool planetary and stellar environments** *by Daniel Kitzmann et al.*

astro-ph/2309.01891: **Early Planet Formation in Embedded Disks (eDisk) VI: Kinematic Structures around the Very Low Mass Protostar IRAS 16253-2429** *by Yusuke Aso et al.*

astro-ph/2309.02044: **FALCO simulations of high-contrast polarimetry with the Nancy Grace Roman Space Telescope Coronagraph Instrument** *by David S. Doelman et al.*

astro-ph/2309.03402: **A Wolf 359 in sheep's clothing: Hunting for substellar companions in the fifth-closest system using combined high-contrast imaging and radial velocity analysis** *by Rachel Bowens-Rubin et al.*

astro-ph/2309.03306: **The Aligned Orbit of the Eccentric Proto Hot Jupiter TOI-3362b** *by Juan I. Espinoza-Retamal et al.*

astro-ph/2309.03256: **Revisiting Orbital Evolution in HAT-P-2 b and Confirmation of HAT-P-2 c** *by Zoë L. de Beurs et al.*

astro-ph/2309.03082: **The Hawaii Infrared Parallax Program. VI. The Fundamental Properties of 1000+ Ultracool Dwarfs and Planetary-mass Objects Using Optical to Mid-IR SEDs and Comparison to BT-Settl and ATMO 2020 Model Atmospheres** *by Aniket Sanghi et al.*

astro-ph/2309.03075: **Parameterizing pressure-temperature profiles of exoplanet atmospheres with neural networks** *by Timothy D. Gebhard et al.*

astro-ph/2309.03009: **Doppler confirmation of TESS planet candidate TOI1408.01: grazing transit and likely eccentric orbit** *by G. A. Galazutdinov et al.*

astro-ph/2309.04042: **Methane Throughout the Atmosphere of the Warm Exoplanet WASP-80b** *by Taylor J. Bell et al.*

astro-ph/2309.03944: **Gaia22dkvLb: A Microlensing Planet Potentially Accessible to Radial-Velocity Characterization** *by Zexuan Wu et al.*

astro-ph/2309.03807: **How to make giant planets via pebble accretion** *by Sofia Savvidou, Bertram Bitsch*

astro-ph/2309.04623: **NMF-based GPU accelerated coronagraphy pipeline** *by Sai Krishanth P. M. et al.*

astro-ph/2309.04518: **Bioverse: The Habitable Zone Inner Edge Discontinuity as an Imprint of Runaway Greenhouse Climates on Exoplanet Demographics** *by Martin Schlecker et al.*

astro-ph/2309.04403: **VLTI/GRAVITY Observations and Characterization of the Brown Dwarf Companion HD 72946 B** *by W. O. Balmer et al.*

astro-ph/2309.06562: **Making Habitable Worlds: Planets Versus Megastructures** *by Raghav Narasimha et al.*

astro-ph/2309.04137: **Two mini-Neptunes Transiting the Adolescent K-star HIP 113103 Confirmed with TESS and CHEOPS** *by Nataliea Lowson et al.*

astro-ph/2309.05716: **New evidence about HW Vir's circumbinary planets from Hipparcos-Gaia astrometry and a reanalysis of the eclipse timing variations using nested sampling** *by Thomas A. Baycroft et al.*

astro-ph/2309.05566: **Carbon-bearing Molecules in a Possible Hycean Atmosphere** *by Nikku Madhusudhan et al.*

astro-ph/2309.05449: **First exploration of the runaway greenhouse transition with a GCM** *by G. Chaverot et al.*

astro-ph/2309.06514: **Vortex Fiber Nulling for Exoplanet Observations: Implementation and First Light** *by Daniel Echeverri et al.*

astro-ph/2309.06076: **Grain Growth and Dust Segregation Revealed by Multi-wavelength Analysis of the Class I Protostellar Disk WL 17** *by Ilseung Han et al.*

astro-ph/2309.07047: **Atmospheric Reconnaissance of TRAPPIST-1 b with JWST/NIRISS: Evidence for Strong Stellar Contamination in the Transmission Spectra** *by Olivia Lim et al.*

astro-ph/2309.06755: **Atmospheric retrievals with petitRADTRANS** *by Evert Nasedkin et al.*

astro-ph/2309.06812: **The dynamical evolution of protoplanetary disks and planets in dense star clusters** *by Francesco Flammini Dotti et al.*

astro-ph/2309.06817: **Detecting molecules in Ariel low resolution transmission spectra** *by Andrea Bocchieri et al.*

astro-ph/2309.06994: **Self-gravity of debris discs can strongly change the outcomes of interactions with inclined planets** *by Pedro P. Poblete et al.*

astro-ph/2309.07040: **JWST imaging of edge-on protoplanetary disks. I. Fully vertically mixed 10μm grains in the outer regions of a 1000 au disk** *by G. Duchene et al.*

astro-ph/2309.07061: **Swarming Proxima Centauri: Optical Communication Over Interstellar Distances** *by T. Marshall Eubanks W. Paul Blase Andreas Hein Adam Hibberd Robert G. Kennedy III*

astro-ph/2309.07114: **Monitoring Hα Emission from the Wide-orbit Brown-dwarf Companion FU Tau B** *by Ya-Lin Wu et al.*

astro-ph/2309.07505: **The Analytical Performance Model and Error Budget for the Roman Coronagraph Instrument** *by Bijan Nemati et al.*

astro-ph/2309.07732: **Finding substructures in protostellar disks in Ophiuchus** *by Arnaud Michel et al.*

astro-ph/2309.07817: **A JWST inventory of protoplanetary disk ices: The edge-on protoplanetary disk HH 48 NE, seen with the Ice Age ERS program** *by J. A. Sturm et al.*

astro-ph/2309.08679: **PACOME: Optimal multi-epoch combination of direct imaging observations for joint exoplanet detection and orbit estimation** *by Jules Dallant et al.*

astro-ph/2309.08672: **Nancy Grace Roman Space Telescope Coronagraph Instrument Overview and Status** *by Vanessa P. Bailey et al.*

astro-ph/2309.08390: **Self-consistent simulation of photoelectrons in exoplanet winds: Faster ionisation and weaker mass loss rates** *by Alexande Gillet et al.*

astro-ph/2309.08665: **Prospects from TESS and Gaia to constrain the flatness of planetary systems** *by Juan I. Espinoza-Retamal et al.*

astro-ph/2309.09037: **Constraining the reflective properties of WASP-178b using Cheops photometry** *by I. Pagano et al.*

astro-ph/2309.09337: **Simulation-based Inference for Exoplanet Atmospheric Retrieval: Insights from winning the Ariel Data Challenge 2023 using Normalizing Flows** *by Mayeul Aubin et al.*

astro-ph/2309.10188: **Atmospheric Retrieval of L Dwarfs: Benchmarking Results and Characterizing the Young Planetary Mass Companion HD 106906 b in the Near-Infrared** *by Arthur D. Adams et al.*

astro-ph/2309.09605: **Metallicity and Spectral Evolution of WASP-39 b: The Limited Role of Hydrodynamic Escape** *by Amy J. Louca et al.*

astro-ph/2309.09945: **TESS Spots a Super-Puff: The Remarkably Low Density of TOI-1420b** *by Stephanie Yoshida et al.*

astro-ph/2309.10845: **Water absorption in the transmission spectrum of the water-world candidate GJ9827d** *by Pierre-Alexis Roy et al.*

astro-ph/2309.10942: **Impact of M-dwarf Stellar Wind and Photoevaporation on the Atmospheric Evolution of Small Planets** *by Ashini Modi et al.*

astro-ph/2309.10640: **Characterising The Atmospheric Dynamics Of HD209458b-like Hot Jupiters Using AI Driven Image Recognition/Categorisation** *by F. Sainsbury-Martinez et al.*

astro-ph/2309.10587: **CROCODILE**
Incorporating medium-resolution spectroscopy of close-in directly imaged exoplanets into atmospheric retrievals via cross-correlation *by Jean Hayoz et al.*

astro-ph/2309.10465: **Exoplanet imaging with ELTs: exploring a second-stage AO with a Zernike wavefront sensor on the ESO/GHOST testbed** *by Mamadou N'Diaye et al.*

astro-ph/2309.11494: **Investigating the Atmospheric Mass Loss of the Kepler-105 Planets Straddling the Radius Gap** *by Aaron Householder et al.*

astro-ph/2309.11390: **TOI-858 B b: A hot Jupiter on a polar orbit in a loose binary** *by J. Hagelberg et al.*

astro-ph/2309.12390: **First light of VLT/HiRISE: High-resolution spectroscopy of young giant exoplanets** *by A. Vigan et al.*

astro-ph/2309.11729: **The possibility of detecting our solar system through astrometry** *by Dong-Hong Wu*

astro-ph/2309.11927: **Beyond the Drake Equation: A Time-Dependent Inventory of Habitable Planets and Life-Bearing Worlds in the Solar Neighborhood** *by Piero Madau*

astro-ph/2309.12635: **Population synthesis of exoplanets accounting for orbital variations due to stellar evolution** *by A. S. Andriushin, S. B. Popov*

astro-ph/2309.13538: **Relative abundances of CO2, CO, and CH4 in atmospheres of Earth-like lifeless planets** *by Yasuto Watanabe, Kazumi Ozaki*

astro-ph/2309.13589: **Planets around evolved intermediate-mass stars III. Planet candidates and long-term activity signals in six open clusters** *by E. Delgado Mena et al.*

astro-ph/2309.14234: **Mitigating Worst-Case Exozodiacal Dust Structure in High-contrast Images of Earth-like Exoplanets** *by Miles H. Currie et al.*

astro-ph/2309.14131: **Photometric follow-up of the 20 Myr-old multi-planet host star V1298 Tau with CHEOPS and ground-based telescopes** *by M. Damasso et al.*

astro-ph/2309.15230: **A Tale of 3 Dwarf Planets: Ices and Organics on Sedna, Gonggong, and Quaoar from JWST Spectroscopy** *by J. P. Emery et al.*

astro-ph/2309.15267: **On the Effectiveness of the Planetary Infrared Excess (PIE) Technique to Retrieve the Parameters of Multiplanet Systems around M dwarfs: A Case Study on the TRAPPIST-1 System** *by L. C. Mayorga et al.*

astro-ph/2309.15239: **Degenerate interpretations of O_3 spectral features in exoplanet atmosphere observations due to stellar UV uncertainties: a 3D case study with TRAPPIST-1e** *by Gregory Cooke et al.*

astro-ph/2309.14915: **TOI-199 b: A well-characterized 100-day transiting warm giant planet with TTVs seen**

from Antarctica *by Melissa J. Hobson et al.*

astro-ph/2309.14605: **Evidence that the Occurrence Rate of Hot Jupiters around Sun-like Stars Decreases with Stellar Age** *by Shota Miyazaki, Kento Masuda*

astro-ph/2309.16054: **Helium Enhanced Planets Along the Upper Edge of the Radius Valley** *by Isaac Malsky et al.*

astro-ph/2309.15972: **The Prospect of Detecting Volcanic Signatures on an ExoEarth Using Direct Imaging** *by Colby M. Ostberg et al.*

astro-ph/2309.15571: **Evolution of a Water-rich Atmosphere Formed by a Giant Impact on an Earth-sized Planet** *by Kenji Kurosaki et al.*

astro-ph/2309.16659: **The Eccentric Kozai-Lidov Mechanism as the Cause of Exocomet Transits of KIC 8462852** *by Steven D. Young, Mark C. Wyatt*