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1 Editorial

Welcome to the 96th edition of Exoplanet News. After a break last month, this month again sees a very full newsletter, with plenty of interesting abstracts as well as lots of conference announcements and job adverts. Two months of arXiv listings are also included. As ever, please continue to encourage your colleagues to submit their abstracts to future editions. The next edition of the newsletter is planned for the beginning of June 2017.

best wishes

Andrew Norton

2 Abstracts of refereed papers

Strong HI Lyman- α variations from an 11 Gyr-old host star: a planetary origin?

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Astronomy & Astrophysics, In press (arXiv:1703.00504)

Kepler-444 provides a unique opportunity to probe the atmospheric composition and evolution of a compact system of exoplanets smaller than the Earth. Five planets transit this bright K star at close orbital distances, but they are too small for their putative lower atmosphere to be probed at optical/infrared wavelengths. We used the Space Telescope Imaging Spectrograph instrument on board the Hubble Space Telescope to search for the signature of the planet's upper atmospheres at six independent epochs in the Lyman- α line. We detect significant flux variations during the transits of both Kepler-444e and f ($\sim 20\%$), and also at a time when none of the known planets was transiting

($\sim 40\%$). Variability in the transition region and corona of the host star might be the source of these variations. Yet, their amplitude over short timescales ($\sim 2\text{--}3$ hours) is surprisingly strong for this old (11.2 ± 1.0 Gyr) and apparently quiet main-sequence star. Alternatively, we show that the in-transit variations could be explained by absorption from neutral hydrogen exospheres trailing the two outer planets (Kepler-444 e and f). They would have to contain substantial amounts of water to replenish hydrogen exospheres such as these, which would reveal them to be the first confirmed ocean planets. The out-of-transit variations, however, would require the presence of an as-yet-undetected Kepler-444 g at larger orbital distance, casting doubt on the planetary origin scenario. Using HARPS-N observations in the sodium doublet, we derived the properties of two interstellar medium clouds along the line of sight toward Kepler-444. This allowed us to reconstruct the stellar Lyman- α line profile and to estimate the XUV irradiation from the star, which would still allow for a moderate mass loss from the outer planets after 11.2 Gyr. Follow-up of the system at XUV wavelengths will be required to assess this tantalizing possibility.

Download/Website: <https://arxiv.org/abs/1703.00504>

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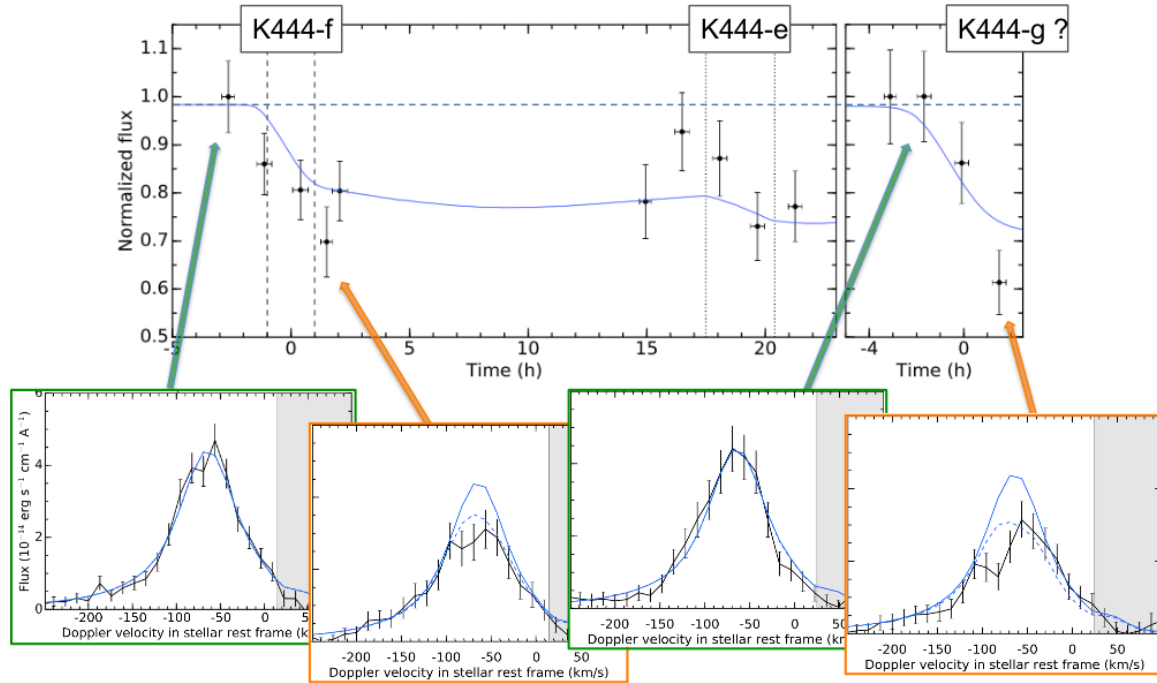


Figure 1: (Bourrier et al.) Ly- α line observations of Kepler-444 obtained with HST/STIS. The upper panel shows the flux integrated in the blue wing of the line, and phased over the ephemeris of Kepler-444f (left subpanel) and of the putative Kepler-444g (right subpanel). Dashed vertical lines indicate the optical transits of Kepler-444e and Kepler-444f. The lower panels show examples of Ly- α line spectra representative of the stable, unocculted stellar line (green subpanels) and spectra that could be absorbed by hydrogen exospheres trailing Kepler-444f and Kepler-444g (orange panels). The blue light curves and spectra correspond to simulations of such exospheres with the EVE code (e.g., Bourrier et al. 2015).

Weighing in on the masses of retired A stars with asteroseismology: K2 observations of the exoplanet-host star HD 212771

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Monthly Notices of the Royal Astronomical Society, in press (arXiv:1704.01794)

Doppler-based planet surveys point to an increasing occurrence rate of giant planets with stellar mass. Such surveys rely on evolved stars for a sample of intermediate-mass stars (so-called retired A stars), which are more amenable to Doppler observations than their main-sequence progenitors. However, it has been hypothesised that the masses of subgiant and low-luminosity red-giant stars targeted by these surveys — typically derived from a combination of spectroscopy and isochrone fitting — may be systematically overestimated. Here, we test this hypothesis for the particular case of the exoplanet-host star HD 212771 using K2 asteroseismology. The benchmark asteroseismic mass ($1.45^{+0.10}_{-0.09} M_{\odot}$) is significantly higher than the value reported in the discovery paper ($1.15 \pm 0.08 M_{\odot}$), which has been used to inform the stellar mass-planet occurrence relation. This result, therefore, does not lend support to the above hypothesis. Implications for the fates of planetary systems are sensitively dependent on stellar mass. Based on the derived asteroseismic mass, we predict the post-main-sequence evolution of the Jovian planet orbiting HD 212771 under the effects of tidal forces and stellar mass loss.

Download/Website: <https://arxiv.org/abs/1704.01794>

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The GTC exoplanet transit spectroscopy survey. V. A spectrally-resolved Rayleigh scattering slope in GJ 3470b

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Astronomy & Astrophysics, in press (arXiv:1703.01817)

As a sub-Uranus-mass low-density planet, GJ 3470b has been found to show a flat featureless transmission spectrum in the infrared and a tentative Rayleigh scattering slope in the optical. We conducted an optical transmission spectroscopy project to assess the impacts of stellar activity and to determine whether or not GJ 3470b hosts a hydrogen-rich gas envelop. We observed three transits with the low-resolution Optical System for Imaging and low-Intermediate-Resolution Integrated Spectroscopy (OSIRIS) at the 10.4 m Gran Telescopio Canarias, and one transit with the high-resolution Ultraviolet and Visual Echelle Spectrograph (UVES) at the 8.2 m Very Large Telescope. From the high-resolution data, we find that the difference of the Ca II H+K lines in- and out-of-transit is only

$0.67 \pm 0.22\%$, and determine a magnetic filling factor of about 10–15%. From the low-resolution data, we present the first optical transmission spectrum in the 435–755 nm band, which shows a slope consistent with Rayleigh scattering. After exploring the potential impacts of stellar activity in our observations, we confirm that Rayleigh scattering in an extended hydrogen-helium atmosphere is currently the best explanation. Further high-precision observations that simultaneously cover optical and infrared bands are required to answer whether or not clouds and hazes exist at high-altitude.

Download/Website: <http://arxiv.org/abs/1703.01817>

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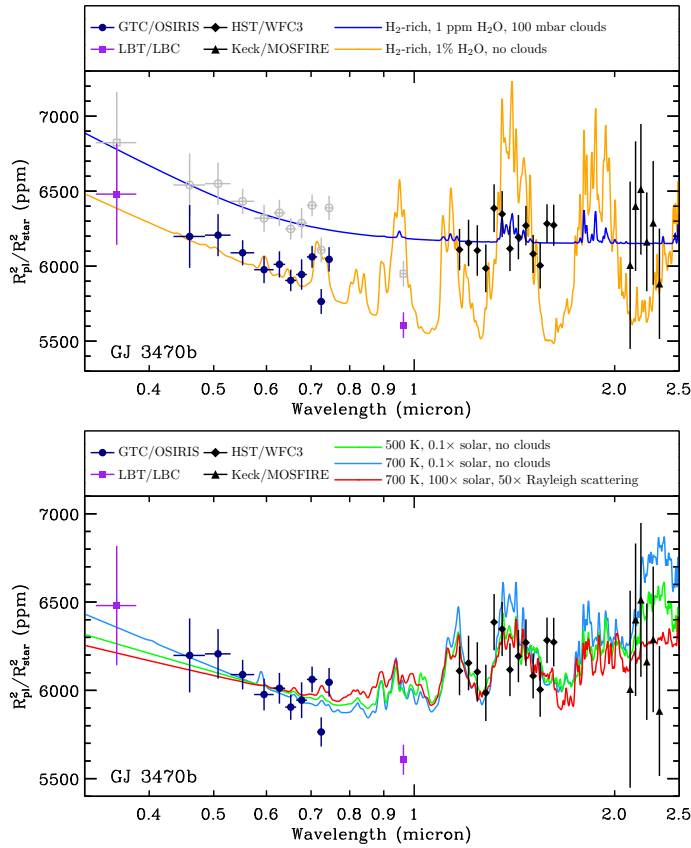


Figure 2: (Chen et al.) Transmission spectrum of GJ 3470b, which includes the transit depth measurements from GTC/OSIRIS (navy-blue circles), LBT/LBC (purple squares), HST/WFC3 (black diamonds), and Keck/MOSFIRE (black triangles). The two models shown in the top panel are taken from Ehrenreich et al. (2014), which correspond to H_2 -rich atmospheres with 1 ppm H_2O and clouds at 100 mbar (blue) or with 1% H_2O and no clouds (orange), respectively. The three models shown in the bottom panel are computed using the Exo-Transmit code (Kempton et al. 2016). In the top panel, the GTC/OSIRIS+LBT/LBC measurements are shifted upwards 343 ppm, and then shown as empty symbols in gray.

The GTC exoplanet transit spectroscopy survey. VI. Detection of sodium in WASP-52b's cloudy atmosphere

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Astronomy & Astrophysics, in press (arXiv:1703.06716)

We report the first detection of sodium absorption in the atmosphere of the hot Jupiter WASP-52b. We observed one transit of WASP-52b with the low-resolution Optical System for Imaging and low-Intermediate-Resolution Integrated Spectroscopy (OSIRIS) at the 10.4 m Gran Telescopio Canarias (GTC). The resulting transmission spectrum, covering the wavelength range from 522 nm to 903 nm, is flat and featureless, except for the significant narrow absorption signature at the sodium doublet, which can be explained by an atmosphere in solar composition with clouds at 1 mbar. A cloud-free atmosphere is stringently ruled out. By assessing the absorption depths of sodium in various bin widths, we find that temperature increases towards lower atmospheric pressure levels, with a positive temperature gradient of $0.88 \pm 0.65 \text{ K km}^{-1}$, possibly indicative of upper atmospheric heating and a temperature inversion.

Download/Website: <https://arxiv.org/abs/1703.06716>

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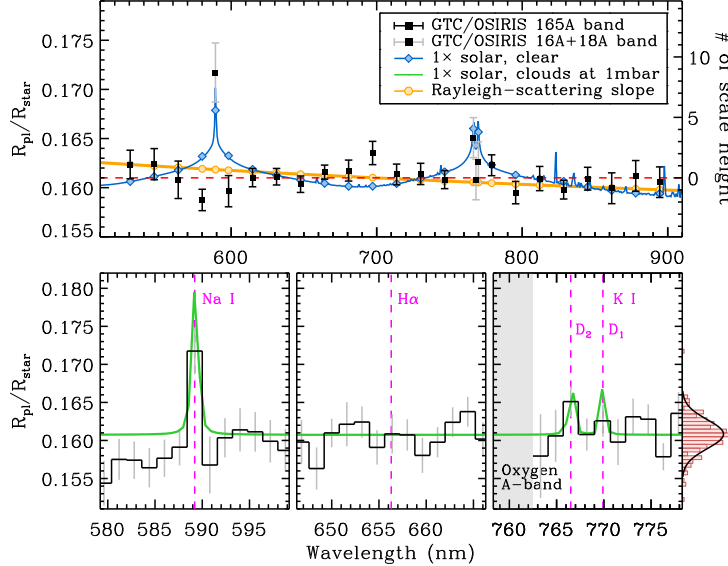


Figure 3: (Chen et al.) Top panel shows the GTC/OSIRIS transmission spectrum of WASP-52b, composed of 22 bins of 16.5 nm, 3 bins of 16 Å centered on Na and K, and 1 bin of 18 Å in-between the K doublet. The blue line shows a 1300 K 1× solar cloud-free model (Kempton et al. 2016). The orange line shows a Rayleigh-scattering model ($\alpha = -4$). The red dashed line shows a flat line at $R_p/R_\star = 0.1608$. Bottom panels show the close-up of Na, H α , and K lines in bins of 16 Å (or 18 Å). The green line shows a 2700 K 1× solar atmosphere with the clouds at 1 mbar. The red histogram on the right shows the distribution of all the 16+18 Å transit depths.

Polarimetry of transiting planets: Differences between plane-parallel and spherical host star atmosphere models

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Astronomy & Astrophysics, 2017A&A...601A...6K

Context. To properly interpret photometric and polarimetric observations of exoplanetary transits, accurate calculations of center-to-limb variations of intensity and linear polarization of the host star are needed. These variations, in turn, depend on the choice of geometry of stellar atmosphere. **Aims:** We want to understand the dependence of the flux and the polarization curves during a transit on the choice of the applied approximation for the stellar atmosphere: spherical and plane-parallel. We examine whether simpler plane-parallel models of stellar atmospheres are good enough to interpret the flux and the polarization light curves during planetary transits, or whether more complicated spherical models should be used. **Methods:** Linear polarization during a transit appears because a planet eclipses a stellar disk and thus breaks left-right symmetry. We calculate the flux and the polarization variations during a transit with given center-to-limb variations of intensity and polarization. **Results:** We calculate the flux and the polarization variations during transit for a sample of 405 extrasolar systems. Most of them show higher transit polarization for the spherical stellar atmosphere. Our calculations reveal a group of exoplanetary systems that demonstrates lower maximum polarization during the transits with spherical model atmospheres of host stars with effective temperatures of $T_{\text{eff}} = 4400 - 5400$ K and surface gravity of $\log g = 4.45 - 4.65$ than that obtained with plane-parallel atmospheres. Moreover, we have found two trends of the transit polarization. The first trend is a decrease in the polarization calculated with spherical model atmosphere of host stars with effective temperatures $T_{\text{eff}} = 3500 - 5100$ K, and the second shows an increase in the polarization for host stars with $T_{\text{eff}} = 5100 - 7000$ K. These trends can be explained by the relative variation of temperature and pressure dependences in the plane-parallel and spherical model atmospheres. **Conclusions:** For most cases of known transiting systems the plane-parallel approximation of stellar model atmospheres may be safely used for calculation of the flux and the polarization curves because the difference between two models is tiny. However, there are some examples where the spherical model atmospheres are necessary to get proper results, such as the systems with grazing transits, with Earth-size planets, or for the hot host stars with effective temperatures higher than 6000 K.

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Optimized trajectories to the nearest stars using lightweight high-velocity photon sails

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(submitted), arXiv:1704.03871

New means of interstellar travel are now being considered by various research teams, assuming light-weight spacechips that can be accelerated either via laser or solar radiation to a significant fraction of the speed of light. We recently demonstrated that gravitational assists can be combined with the deflection from the stellar photon pressure to decelerate an incoming lightsail from Earth and either fling it around a star or bring it to rest. Here we demonstrate that such a photogravitational assist is more effective when the star is used as a bumper (i.e. the sail passes “in front

of” the star) rather than as a catapult (i.e. the sail passes “behind” or “around” the star). This increases the maximum deceleration at α Cen A and B and reduces the travel time of a nominal sail with a mass-to-surface ratio (σ) similar to graphene ($8.6 \times 10^{-4} \text{ gram m}^{-2}$) from 95 yr to 75 yr. The maximum possible velocity (v_∞) that can be absorbed upon arrival depends on the required deflection angle from α Cen A to B and therefore on the orbital phase of α Cen AB. Here we calculate the resulting variation of the travel times from Earth to Proxima for the next 300 yr. We then compute the travel times for all stars within about 300 ly with available parallaxes from either Hipparcos or Gaia (about 22,000 in total). Although α Cen is the most nearby star system, we find that Sirius A, with a luminosity of 24 solar luminosities, offers the maximum possible deceleration in the solar neighborhood, and therefore the shortest possible travel times: 69 yr assuming 12.5 % c can be obtained at departure from the solar system. Sirius A thus offers the opportunity of fly-by exploration plus deceleration into a bound orbit of the companion white dwarf after relatively short times of interstellar travel.

Download/Website: <https://arxiv.org/abs/1704.03871>

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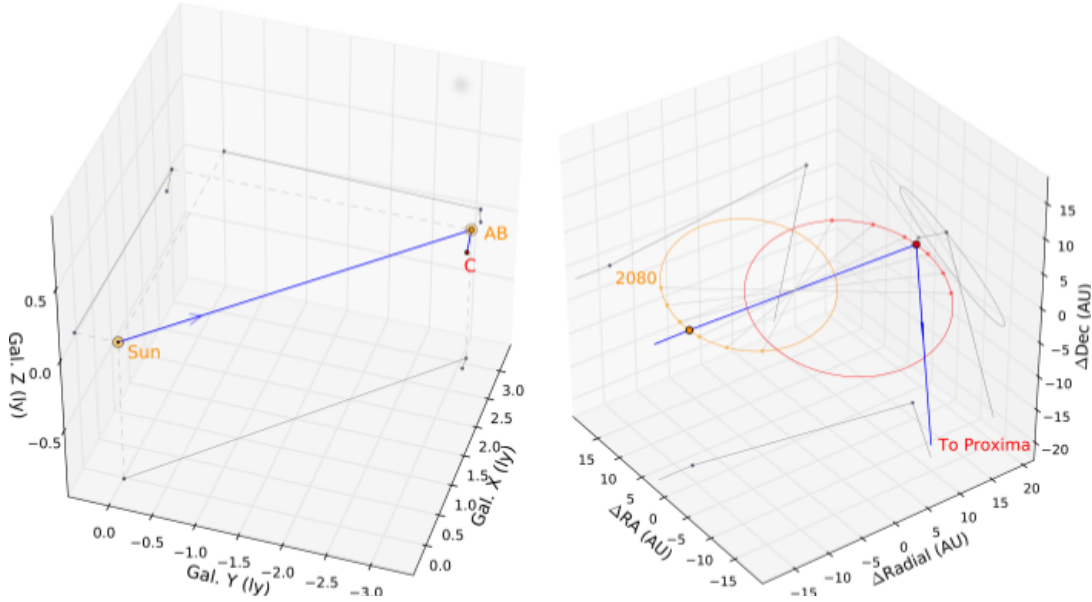


Figure 4: (Heller et al.) Example trajectory (blue line) of a lightsail from Earth performing photogravitational assists at α Cen A and B toward Proxima. Projections of the trajectory on the three planes of the coordinate systems are shown as grey lines. *Left:* Large-scale overview of the trajectory from the Sun to α Cen in Galactic coordinates (in units of ly). X increases toward the Galactic center, Y is positive toward the Galactic direction of rotation, and is Z positive toward the north Galactic pole. *Right:* Orbital configuration of the α Cen AB binary upon arrival of the lightsail in 2092.69. The origin of the differential cartesian ICRS coordinate system (in units of AU) is located in the α Cen AB barycenter. The points on the orbits of A (orange ellipse) and B (red ellipse) are separated by 5 yr to illustrate the evolution of the stellar positions. The projection of the binary orbit on the Earth sky is shown in the RA-Dec plane.

Efficiency of thermal relaxation by radiative processes in protoplanetary discs: constraints on hydrodynamic turbulence

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Astronomy & Astrophysics, accepted (arXiv:1704.06786)

Hydrodynamic, non-magnetic instabilities can provide turbulent stress in the regions of protoplanetary discs, where the MRI can not develop. The induced motions influence the grain growth, from which formation of planetesimals begins. Thermal relaxation of the gas constrains origins of the identified hydrodynamic sources of turbulence in discs. We estimate the radiative relaxation timescale of temperature perturbations and study the dependence of this timescale on the perturbation wavelength, the location within the disc, the disc mass, and the dust-to-gas mass ratio. We then apply thermal relaxation criteria to localise modes of the convective overstability, the vertical shear instability, and the zombie vortex instability. Our calculations employed the latest tabulated dust and gas mean opacities and we account for the collisional coupling to the emitting species. The relaxation criterion defines the bulk of a typical T Tauri disc as unstable to the development of linear hydrodynamic instabilities. The midplane is unstable to the convective overstability from at most 2 au and up to 40 au, as well as beyond 140 au. The vertical shear instability can develop between 15 au and 180 au. The successive generation of (zombie) vortices from a seeded noise can work within the inner 0.8 au. Dynamic disc modelling with the evolution of dust and gas opacities is required to clearly localise the hydrodynamic turbulence, and especially its non-linear phase.

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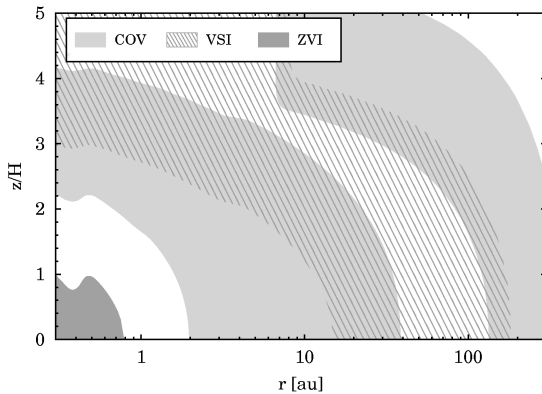


Figure 5: (Malygin et al.) Constraints on the origin of hydrodynamic instabilities in discs. ZVI (grey): zombie vortex instability, $Pe > 10^4$, $\tilde{\lambda}_z = 2$; COV (light grey): convective overstability, $10^{-2} \leq \Omega t \leq 10^2$, $\tilde{\lambda}_z = 2$; VSI (hatched): vertical shear instability, $\Omega t \leq 6.25 \times 10^{-2}$, $\tilde{\lambda}_r = 0.628$.

On the Origin of the Spiral Morphology in the Elias 227 Circumstellar Disk

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Astrophysical Journal Letters, published (2017ApJ...839L..24M)

The young star Elias 2–27 has recently been observed to possess a massive circumstellar disk with two prominent large-scale spiral arms. In this Letter, we perform three-dimensional Smoothed Particle Hydrodynamics simulations, radiative transfer modeling, synthetic ALMA imaging, and an unsharp masking technique to explore three possibilities for the origin of the observed structures — an undetected companion either internal or external to the spirals, and a self-gravitating disk. We find that a gravitationally unstable disk and a disk with an external companion can produce morphology that is consistent with the observations. In addition, for the latter, we find that the companion could be a relatively massive planetary-mass companion ($\leq 10 - 13 M_{\text{Jup}}$) and located at large radial distances (between $\approx 300 - 700$ au). We therefore suggest that Elias 2–27 may be one of the first detections of a disk undergoing gravitational instabilities, or a disk that has recently undergone fragmentation to produce a massive companion.

Download/Website: <http://adsabs.harvard.edu/abs/2017ApJ...839L..24M>

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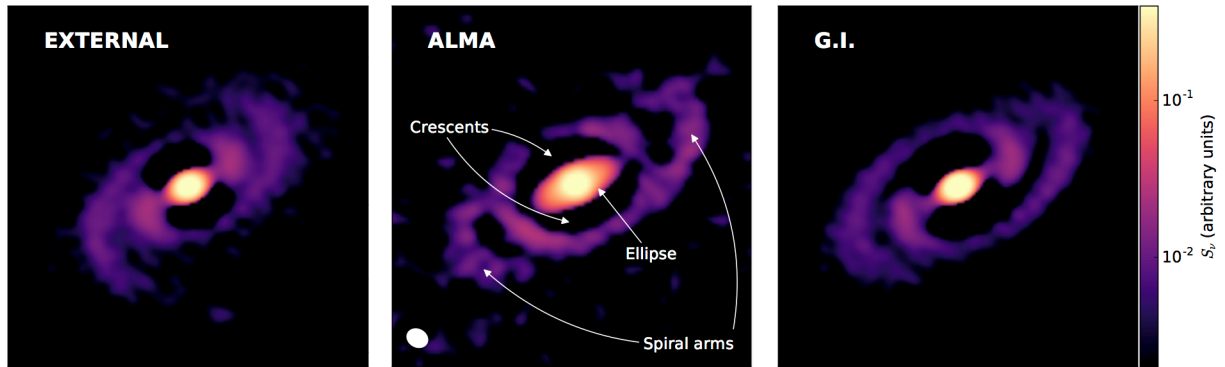


Figure 6: (Meru et al.) Center: 1.3 mm ALMA continuum image of Elias 2–27, processed with an unsharp masking filter (originally presented by Pérez et al. 2016). Two symmetric spiral arms, a bright inner ellipse, and two dark crescents are clearly visible. The beam is shown in the lower left corner as a filled ellipse. Left & Right: ALMA images processed with the same unsharp masking filter as the observation, for the simulations involving a companion external to the spirals (left) and a gravitationally unstable disk (right). Both the companion and the self-gravitating disk scenarios show morphology that are consistent with the observation.

KELT-11b: A Highly Inflated Sub-Saturn Exoplanet Transiting the $V=8$ Subgiant HD 93396

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¹³ Department of Astronomy, The Ohio State University, Columbus, OH 43210, USA

¹⁴ Perth Exoplanet Survey Telescope, Perth, Australia

¹⁵ Adelaide, Australia

¹⁶ American Association of Variable Star Observers, 49 Bay State Rd., Cambridge, MA 02138, USA

¹⁷ Hazelwood Observatory, Australia

¹⁸ Department of Astronomy, California Institute of Technology, 1200 E. California Boulevard, MC 249-17, Pasadena, CA 91125, USA

¹⁹ Jet Propulsion Laboratory, California Institute of Technology, 4800 Oak Grove Drive, Pasadena, CA 91109, USA

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²⁶ Ellinbank Observatory, Victoria, Australia

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²⁸ School of Physics, University of New South Wales, Sydney, NSW 2052, Australia

²⁹ Australian Center for Astrobiology, University of New South Wales, Sydney, NSW 2052, Australia

³⁰ Computational Engineering and Science Research Centre, University of Southern Queensland, Toowoomba, Queensland 4350, Australia

³¹ Department of Physics and Astronomy, University of Montana, Missoula, MT 59812, USA

The Astrophysical Journal, published (2017AJ...153..215P)

We report the discovery of a transiting exoplanet, KELT-11b, orbiting the bright ($V = 8.0$) subgiant HD 93396. A global analysis of the system shows that the host star is an evolved subgiant star with $T_{\text{eff}} = 5370 \pm 51$ K, $M_* = 1.438^{+0.061}_{-0.052} M_{\text{Sun}}$, $R_* = 2.72^{+0.21}_{-0.17} R_{\text{Sun}}$, $\log g = 3.727^{+0.040}_{-0.046}$, and $[\text{Fe}/\text{H}] = 0.180 \pm 0.075$. The planet is a low-mass gas giant in a $P = 4.736529 \pm 0.00006$ day orbit, with $M_P = 0.195 \pm 0.018 M_J$, $R_P = 1.37^{+0.15}_{-0.12} R_J$, $\rho_P = 0.093^{+0.028}_{-0.024} \text{ g cm}^{-3}$, surface gravity $\log g_P = 2.407^{+0.080}_{-0.086}$, and equilibrium temperature $T_{\text{eq}} = 1712^{+51}_{-46}$ K. KELT-11 is the brightest known transiting exoplanet host in the southern hemisphere by more than a magnitude, and is the 6th brightest transit host to date. The planet is one of the most inflated planets known, with an exceptionally large atmospheric scale height (2763 km), and an associated size of the expected atmospheric transmission signal of 5.6%. These attributes make the KELT-11 system a valuable target for follow-up and atmospheric characterization, and it promises to become one of the benchmark systems for the study of inflated exoplanets.

Download/Website: <https://arxiv.org/abs/1607.01755>

Contact: joshua.pepper@lehigh.edu

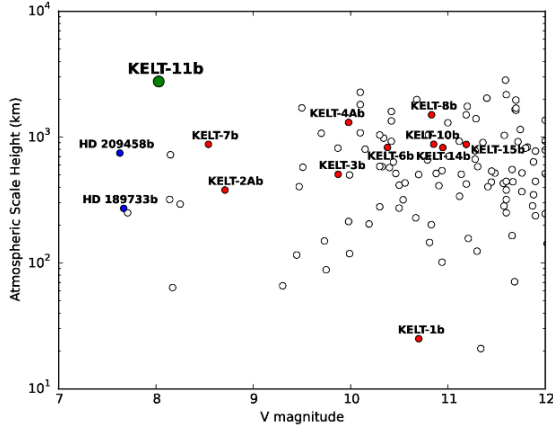


Figure 7: (Pepper et al.) Estimated atmospheric scale height of known transiting hot Jupiters vs. the V-band brightness of the host star. KELT-11b is highlighted by a filled green circle, while other discoveries from the KELT survey are marked by filled red circles. The filled blue circles mark the two well-studied benchmark hot Jupiters HD 209458b and HD 189733b. The open circles mark other known transiting exoplanets from the NASA Exoplanet Archive (accessed on 2016 May 28).

Spectroscopic Evolution of Disintegrating Planetesimals: Minute to Month Variability in the Circumstellar Gas Associated with WD 1145+017

Seth Redfield¹, Jay Farihi², P. Wilson Cauley¹, Steven G. Parsons³, Boris T. Gänsicke⁴, Girish M. Duvvuri¹

¹ Astronomy Department and Van Vleck Observatory, Wesleyan University, Middletown, CT 06459, USA

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The Astrophysical Journal, published (2017ApJ...839...42R)

With the recent discovery of transiting planetary material around WD 1145+017, a critical target has been identified that links the evolution of planetary systems with debris disks and their accretion onto the star. We present a series of observations, five epochs over a year, taken with Keck and the VLT, which for the first time show variability of circumstellar absorption in the gas disk surrounding WD 1145+017 on timescales of minutes to months. Circumstellar absorption is measured in more than 250 lines of 14 ions among 10 different elements associated with planetary composition, e.g., O, Mg, Ca, Ti, Cr, Mn, Fe, and Ni. Broad circumstellar gas absorption with a velocity spread of 225 km s^{-1} is detected, but over the course of a year blueshifted absorption disappears, while redshifted absorption systematically increases. A correlation of equivalent width and oscillator strength indicates that the gas is not highly optically thick (median $\tau \approx 2$). We discuss simple models of an eccentric disk coupled with magnetospheric accretion to explain the basic observed characteristics of these high-resolution and high signal-to-noise observations. Variability is detected on timescales of minutes in the two most recent observations, showing a loss of redshifted absorption for tens of minutes, coincident with major transit events and consistent with gas hidden behind opaque transiting material. This system currently presents a unique opportunity to learn how the gas causing the spectroscopic, circumstellar absorption is associated with the ongoing accretion evidenced by photospheric contamination, as well as the transiting planetary material detected in photometric observations.

Download/Website: <https://arxiv.org/abs/1608.00549>

Contact: sredfield@wesleyan.edu

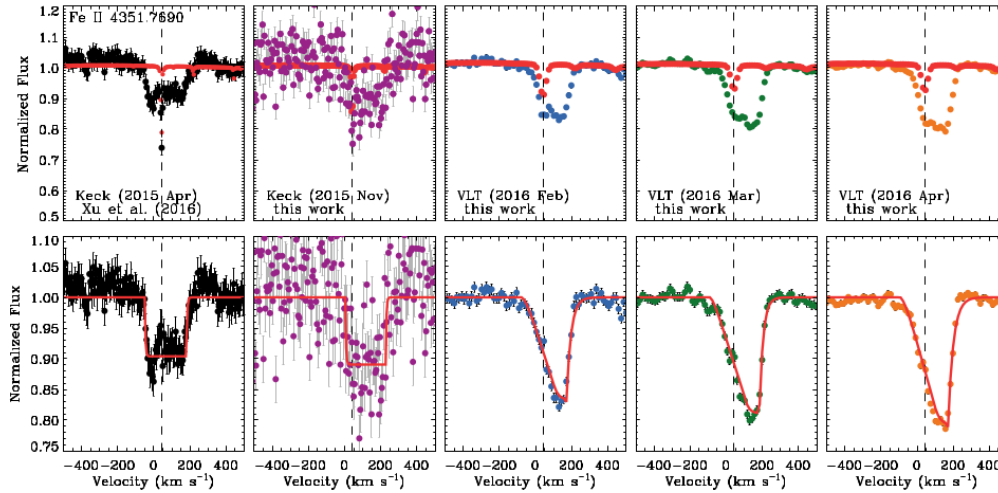


Figure 8: (Redfield et al.) Example of circumstellar profile variability and fitting. The Fe 2 4351.7 Å line is shown, one of more than 250 lines with circumstellar absorption detected. The top row shows the observed spectrum for each epoch with the stellar model overlaid in red. The bottom row of each shows the stellar lines removed, leaving only the circumstellar absorption. A simple trapezoidal model is shown in red (a simple box for the Keck epochs and a trapezoid with a tapered blue edge for the VLT epochs and convolved with the instrumental line spread function). Dramatic changes are seen between the 2015 and 2016 epochs, while subtle, but significant changes are seen in the monthly observations in 2016.

Eclipse, transit and occultation geometry of planetary systems at exo-syzygy

Dimitri Veras, Elmé Breedt

Department of Physics, University of Warwick, Coventry CV4 7AL, UK

Monthly Notices of the Royal Astronomical Society, in press (arXiv:1703.03414)

Although conjunctions and oppositions frequently occur in planetary systems, eclipse-related phenomena are usually described from an Earth-centric perspective. Space missions to different parts of the Solar system, as well as the mounting number of known exo-planets in habitable zones and the possibility of sending featherweight robot spacecraft to them, prompt broader considerations. Here, we derive the geometry of eclipses, transits and occultations from a primarily exo-Earth viewpoint, and apply the formulation to the Solar system and three types of three-body extrasolar planetary systems: with 1 star and 2 planets (Case I), with 2 stars and 1 planet (Case II), and with 1 planet, 1 star and 1 moon (Case III). We derive the general conditions for total, partial and annular eclipses to occur at exo-syzygy, and implement them in each case in concert with stability criteria. We then apply the formalism to the TRAPPIST-1, Kepler-444 and Kepler-77 systems – the first of which contains multiple potentially habitable planets – and provide reference tables of both Solar system and TRAPPIST-1 syzygy properties. We conclude by detailing a basic algebraic algorithm which can be used to quickly characterize eclipse properties in any three-body system.

Download/Website: <http://arxiv.org/abs/1703.03414>

Contact: d.veras@warwick.ac.uk

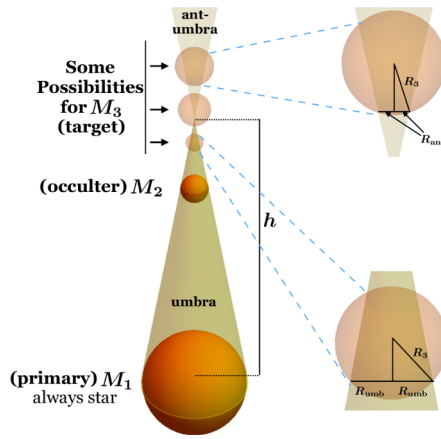


Figure 9: (Veras & Breedt) A geometrical sketch for the umbra and antumbra. The cone defined by the radiation emitted from the spherical primary has a height h and circumscribes the occulter. If the target intersects the umbral cone at syzygy, then a total eclipse will occur as seen by an observer on the target. The projected area of the total eclipse area is defined by the radius R_{umb} . Otherwise, an annular eclipse will occur, with a projected radius of R_{ant} .

Predicting radio emission from the newborn hot Jupiter V830 Tau b and its host star

A. A. Vidotto¹, J.-F. Donati^{2,3}

¹ School of Physics, Trinity College Dublin, University of Dublin, Ireland

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³ CNRS, IRAP / UMR 5277, 14 avenue E. Belin, Toulouse F-31400, France

Astronomy & Astrophysics, in press

Magnetised exoplanets are expected to emit at radio frequencies analogously to the radio auroral emission of Earth and Jupiter. Here, we predict the radio emission from V830 Tau b, the youngest (2 Myr) detected exoplanet to date. We model the wind of its host star using three-dimensional magnetohydrodynamics simulations that take into account the reconstructed stellar surface magnetic field. Our simulations allow us to constrain the local conditions of the environment surrounding V830 Tau b that we use to then compute its radio emission. We estimate average radio flux densities of 6 to 24 mJy, depending on the assumption of the radius of the planet (one or two Jupiter radii). These radio fluxes are not constant along one planetary orbit, and present peaks that are up to twice the average values. We show here that these fluxes are weakly dependent (a factor of 1.8) on the assumed polar planetary magnetic field (10 to 100 G), opposed to the maximum frequency of the emission, which ranges from 18 to 240 MHz. We also estimate the thermal radio emission from the stellar wind. By comparing our results with the Karl G. Jansky Very Large Array and the Very Long Baseline Array observations of the system, we constrain the stellar mass-loss rate to be $< 3 \times 10^{-9} M_{\odot} \text{ yr}^{-1}$, with likely values between $\sim 10^{-12}$ and $10^{-10} M_{\odot} \text{ yr}^{-1}$. With these values, we estimate that the frequency-dependent extension of the radio-emitting wind is around ~ 3 to 30 stellar radii (R_{\star}) for frequencies in the range of 275 to 50 MHz, implying that V830 Tau b, at an orbital distance of $6.1 R_{\star}$, could be embedded in the regions of the host star's wind that are optically thick to radio wavelengths, but not deeply so. We also note that planetary emission can only propagate in the stellar wind plasma if the frequency of the cyclotron emission exceeds the stellar wind plasma frequency. In other words, we find that for planetary radio emission to propagate through the host star wind, planetary magnetic field strengths larger than ~ 1.3 to 13 G are required. Since our radio emission computations are based on analogies with solar system planets, we caution that our computations should be considered as estimates. Nevertheless, the V830 Tau system is a very interesting system for conducting radio observations from both the perspective of radio emission from the planet as well as from the host star's wind.

Download/Website: <https://arxiv.org/abs/1703.03622>

Contact: Aline.Vidotto@tcd.ie

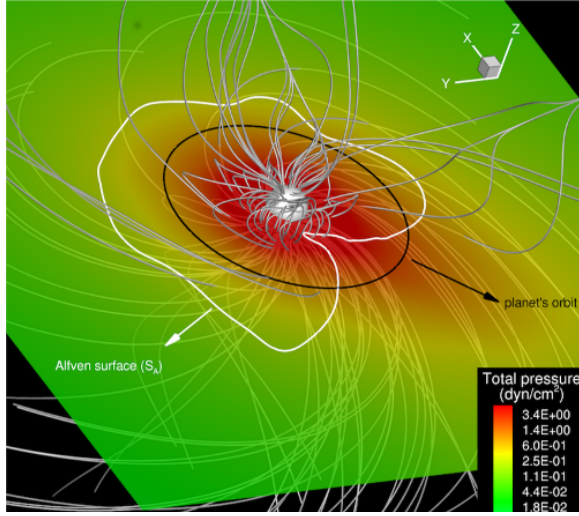


Figure 10: (Vidotto & Donati) Simulated wind of the planet hosting star V830 Tau. Thin grey lines represent the magnetic field of V830 Tau that is embedded in the wind. The circle depicts the orbital radius of V830 Tau b, assumed to lie in the equatorial plane of the star (xy plane). The white line represents a cut of the Alfvén surface at the equatorial plane, while the colour shows the total wind pressure.

3 Non-refereed papers

Circular periodic orbits, resonance capture and inclination excitation during type II migration

Kyriaki I. Antoniadou^{1,2} and George Voyatzis¹

¹ Aristotle University of Thessaloniki, Department of Physics, University Campus, 54124 Thessaloniki, Greece

² University of Namur, Department of Mathematics, NaXys, 8 Rempart de la Vierge, 5000 Namur, Belgium

Proceedings of the First Greek-Austrian Workshop on Extrasolar Planetary Systems, Eds.: T. I. Maindl, H. Varvoglis, R. Dvorak, published (2017pfga.proc....1A)

We consider planetary systems evolving under the effect of a Stokes-type dissipative force mimicking the outcome of a type II migration process. As inward migration proceeds and the planets follow the circular family (they start on circular orbits) and even though they are initially almost coplanar, resonance capture can be realized. Then, at the *vertical critical orbits* (VCOs), that the circular family possesses, the inclination excitation can abruptly take place. The planets are now guided by the spatial elliptic families, which bifurcate from those critical orbits. We herein, perform a direct link of mutually inclined stable planetary systems on circular orbits trapped in *mean-motion resonance* (MMR) with the existence of VCOs of high values of multiplicity. It is shown that the more the multiplicity of the periodic orbits of the circular family increases, the more VCOs (corresponding to more MMRs) appear. In this way, we can provide a justification for the existence of resonant planets on circular orbits, which could, even further to that, evolve stably if they were mutually inclined.

Download/Website: <https://www.createspace.com/6970973>

Contact: kyant@auth.gr

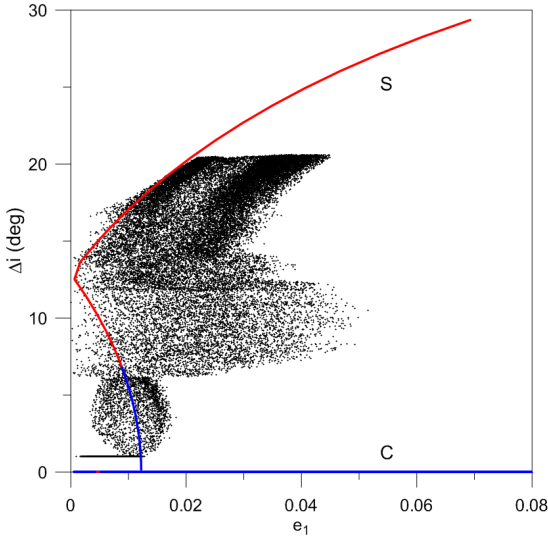


Figure 11: (Antoniadou & Voyatzis) Capture in 5/2 MMR and evolution (black dots) along a spatial symmetric elliptic family, S , which bifurcated from the circular, C , one. The mutual inclination, Δi , increased abruptly, when the VCO was met. Blue bold lines refer to the stable periodic orbits, while the red coloured to the unstable ones.

4 Conference announcements

The ESA PLATO Mission Conference 2017: Exoplanetary Systems in the PLATO era

Don Pollacco

Department of Physics University of Warwick, Gibbet Hill Road, Coventry CV4 7AL, UK

University of Warwick, UK, 5-7th September 2017

We are pleased to announce that registration for the 2017 PLATO Mission Conference is now open. The conference will be held from 5-7th September 2017 at Warwick University, UK. PLATO is the ESA M3 mission with a launch date in 2026 with the objective of the detection and characterisation of rocky planets in the habitable zones of nearby solar type stars. This conference aims to bring together the PLATO community with interests in Exoplanet and Stellar science as well as other areas the mission will make a major contribution to, such as aspects of extragalactic research. In particular we hope to foster a closer relationship between solar system and exoplanetary astronomers.

Confirmed Speakers include:

Suzanne Aigrain, Nate Bastian, Othman Benomar, Doris Breuer, Santi Cassisi, Margarida Cunha, Patrick Eggenberger, Antonio Garcia-Munoz, Laurene Jouve, Andrea Miglio, Christoph Mordasini, Samaya Nissanke, Antoine Strugarek, Stephane Udry.

We look forward to welcoming you to Warwick!

Don Pollacco

Download/Website: <http://www2.warwick.ac.uk/fac/sci/physics/research/astro/research/meetings/plato.mission-conference2017>

Contact: d.pollacco@warwick.ac.uk

51st ESLAB Symposium: 'Extreme Habitable Worlds'

Elliot Sefton-Nash

Science Support Office, Directorate of Science, ESTEC, European Space Agency, Keplerlaan 1, 2201 AZ Noordwijk, The Netherlands

European Space Research and Technology Centre (ESTEC), The Netherlands, 4-8th December 2017

First announcement

This interdisciplinary Symposium will focus on key areas regarding extreme habitability on Earth, in the solar system and throughout the universe.

Major themes to be presented on and discussed may include:

- Venus, Earth, and Mars - the first 500 million years.
- Planetary processes and habitability: accretion, evolution, impacts and ingredients.
- Evolution of habitability and settings for origins of life on Earth.
- Extreme surface and subsurface habitats on Earth.
- Life support systems in extreme places and in orbit (human spaceflight).
- Making the Moon habitable.
- Mars past, current, and future habitability.
- Asteroids and small bodies.
- Outer solar system: Sub-surface habitability at the icy moons of Jupiter and Saturn.
- Effects of space weather and astrophysical hazards.
- Planetary protection and measuring extreme biomarkers.
- Stellar, interstellar and interplanetary ingredients for extreme habitability.
- Engineering of travel to and exploration of Extreme Habitable Worlds.
- Finding and characterising habitable exoplanets: Proxima Centauri, Trappist-1 and beyond.
- Galactic and extragalactic habitability.
- Education, outreach, societal, philosophical & artistic views on 'Extreme Habitable Worlds'.

Please find further details, including key dates and logistical information, on the website.

Registration and abstract submission are scheduled to open on 16th May. We look forward to your participation.

Scientific Organising Committee: B. Foing (chair) , M. Drinkwater, M. Guainazzi, A. Heras, K. Isaak, A. Kolodziejczyk, O. Korablev (COSPAR), D. Koschny, C. Lasseur, P. Lecomte, M. Paganini, E. Sefton-Nash, H. Svedhem, D. Titov, J. Vago, O. Witasse, J. Zender

Local Organising Committee: E. Sefton-Nash (co-chair), B. Foing (co-chair), M. Riemens, C. Avdellidou , R. Rudawska

Institutional support: ESA, ESTEC, ESA Science Support Office, COSPAR, ILEWG

Download/Website: <http://esaconferencebureau.com/2017-events/eslab2017>

Contact: esefton@cosmos.esa.int

The 2nd Rencontres du Vietnam on Exoplanetary Science

Guillaume Hébrard

CNRS, Institut d'astrophysique de Paris / Observatoire de Haute-Provence, France

Quy Nhon, Vietnam, from February 25 to March 2, 2018

Exoplanetology has experienced extraordinary developments, and is now a mature and particularly dynamic research field of astrophysics. The various detection technics such as radial velocities, transit, microlensing, direct imaging, timing or astrometry, provided thousands of planet detections. The characterization of these systems also enhances, and now reaches the details of the orbital parameters or the physics and chemistry of planetary atmospheres.

The 2nd Rencontres du Vietnam on Exoplanetary Science will offer over five days a fruitful meeting of observers involved in various ground- and space-based programs with modelers and theoreticians, in order to raise new observations and new models to improve our comprehension and knowledges of exoplanets, their formation, their evolution. It will expand exchanges, interactions, and collaborations between scientists from different parts of the world. The conference will consist of plenary sessions for oral presentations, including review talks and contributions on more specialized topics, as well as posters. The conference will be preceded by a two-day international school for students involved in those topics, with instructors and teachers chosen among the conference participants.

Important dates:

- April 7th, 2017: first announcement of the conference
- June 30th, 2017: announcement of invited speakers
- December 1st, 2017: deadline for abstract submissions and financial support applications
- February 1st, 2018: deadline for registrations

Scientific Organisation Committee:

- Eiji Akiyama (National Astronomical Observatory of Japan, Japan)
- Michael Albrow (University of Canterbury, New Zealand)
- Isabelle Baraffe (University of Exeter, United Kingdom)
- Andrew Collier-Cameron (University of St Andrews, United Kingdom)
- Rodrigo Daz (Buenos Aires University, Argentina)
- René Doyon (Université de Montréal, Canada); Diana Dragomir (MIT Kavli Institute, USA)
- Roger Ferlet (Institut d'astrophysique de Paris, France)
- Guillaume Hébrard (Institut d'astrophysique de Paris, France), chair
- Tobias C. Hinse (Korea Astronomy & Space Science Institute, Korea)
- Jacques Laskar (Observatoire de Paris, France)
- Alain Lecavelier des Etangs (Institut d'astrophysique de Paris, France)
- Doug Lin (University of California, USA); Jack Lissauer (NASA Ames Research Center, USA)
- Michel Mayor (Geneva, Switzerland); Rosemary Mardling (Monash University, Australia)
- Claire Moutou (Canada-France-Hawaii Telescope, USA)
- Norio Narita (National Astronomical Observatory of Japan, Japan)
- Heike Rauer (Institute for Planetary Research, Germany); Sujan Sengupta (Indian Institute of Astrophysics, India)
- Feng Tian (Tsinghua University, Beijing, China); Jean Tran Thanh Van (ICISE, Vietnam)

Download/Website: http://rencontresdುವietnam.org/conferences/2018/exoplanetary_science

Contact: hebrard@iap.fr

Transiting Exoplanets Conference

SOC: C. Hellier, N. Batalha, D. Charbonneau, H. Knutson, D. Pollacco, D. Queloz, H. Rauer;

LOC: C. Hellier, J. Southworth, D.R. Anderson, P.F.L. Maxted, B. Smalley

Keele University, UK, 17th–21st July 2017

Talk Programme is now available at <https://wasp-planets.net/conference/> Registration is open until the end of May.

Download/Website: <http://wasp-planets.net/conference/>

Contact: exoplanets2017@keele.ac.uk

Know Thy Star – Know Thy Planet: Assessing the Impact of Stellar Characterization on Our Understanding of Exoplanets

David Ciardi

Pasadena Hilton, October 9-12, 2017

Registration and abstract submission are now open for the Know Thy Star Know - Thy Planet Conference to be held October 9-12, 2017 in Pasadena, CA.

This four-day meeting will focus on the needs for stellar characterization, bound (and unbound) companions, false positive assessment, and planetary characterization with an emphasis on the techniques necessary to accomplish these goals. The follow-up needs for radial velocity, transit, direct imaging, and microlensing detections of planets are similar but also different in detail.

This meeting will gather experts in the field to understand community needs for follow-up observations in the era of *K2* and *TESS* and leading into *JWST*, *PLATO*, and *WFIRST*. A preliminary agenda can be found on the conference website.

NASA attendees: Please forecast your attendance at this conference through your center as soon as possible. The NCTS number is 29202-18.

Important Dates

- April 28: Registration and Abstract Submission Site Available
- July 28: Abstract Submission Deadline
- September 7: Registration Deadline and Hotel Reservation Deadline at the Pasadena Hilton
- October 2: Deadline to purchase tickets for conference social events
- October 8: Opening reception at El Cholo restaurant
- October 9-12: Know Thy Star - Know Thy Planet conference at the Pasadena Hilton

Download/Website: <http://nexsci.caltech.edu/conferences/2017/knowthystar/>

Contact: knowthystar@ipac.caltech.edu

2017 Sagan Summer Workshop: Microlensing in the Era of WFIRST

D. Gelino, R. Paladini

NASA Exoplanet Science Institute, California Institute of Technology, Pasadena, CA, USA

Pasadena, CA, August 7-11, 2017

The 2017 Sagan Summer Workshop workshop will focus on searching for planets with WFIRST microlensing. Leaders in the field will discuss the importance of microlensing to understanding planetary populations and demographics, especially beyond the snow line. They will review the microlensing method, both in the context of current capabilities and the future WFIRST microlensing survey. In addition, speakers will address the broad potential of the WFIRST's Wide Field Imaging microlensing survey for (non-microlensing) science in the galactic bulge. Attendees will participate in hands-on group projects related to the WFIRST microlensing planet survey and will have the opportunity to present their own work through short presentations (research POPs) and posters. Please visit the website to view the agenda.

Topics to be covered include:

- Microlensing Science: Current and Future
- An Introduction to the Theory of Microlensing
- Fitting Microlensing Light Curves
- The K2/C9 and Spitzer Microlens Parallax Campaigns
- The WFIRST Microlensing Survey
- Planet Populations Beyond the Snow Line: Formation and Demographics
- Galactic Science with Wide Field imaging Data in the Galactic Bulge, including microlensing and Galactic Structure
- Finding Exotic Massive Objects with Microlensing

Important Dates

- January 27, 2017: On-line Registration period open
- May 26, 2017: POP/Poster/Talk submission period open and on-line lunch and workshop dinner purchase periods open
- July 14, 2017: deadline for POP/Poster/Talk submission and deadline to purchase lunches and workshop dinner
- July 29, 2017: final agenda posted
- August 7-11, 2017: Sagan Exoplanet Summer Workshop

Download/Website: <http://nexsci.caltech.edu/workshop/2017>

Contact: sagan_workshop@ipac.caltech.edu

The Exoclipse Conference

David Bennett, Scientific Organizing Committee Chair

NASA Goddard Space Flight Center, Greenbelt, MD 20771, USA

Boise State University, 2017 Aug 20-24

Exoclipse is an exoplanet conference designed to shed light on the growing population of known planets on wide orbits. Topics include discovery strategies, nascent population statistics, formation mechanisms, the planetary initial mass function, and connections to other populations of planets in short and moderate periods. We will discuss instrumentation and observing strategies for detecting and characterizing the planets, including ground-based and space-based coronagraphy, long-term RV monitoring, and microlensing and transit work from the ground and space. We will explore the possibility of discovering extrasolar analogs to Saturn, Uranus, and Neptune, and assess how observations can discriminate between formation models of wide-orbit planets.

Hosted by Boise State University, the conference spans five days (2017 Aug 20-24) and includes a trip to view the total solar eclipse on Aug 21. Friends and family are welcome to attend the eclipse-viewing, although space will be limited.

Abstracts and travel/dependent care grant applications are due by 2017 June 2. Registration is due by 2017 June 20.

SCIENTIFIC ORGANIZING COMMITTEE:

Charles Beichman (California Institute of Technology), David Bennett (NASA Goddard Space Flight Center), Beth Biller (University of Edinburgh), Sarah Dodson-Robinson (University of Delaware), Hannah Jang-Condell (University of Wyoming), Bruce Macintosh (Stanford University), Stan Metchev (University of Western Ontario), & Aki Roberge (NASA Goddard Space Flight Center)

LOCAL ORGANIZING COMMITTEE:

Christine Chang (Boise State University), Brian Jackson (Boise State University), Daryl Macomb (Boise State University), Christian Marois (NRC-Herzberg), Angelle Tanner (Mississippi State University), & Tiffany Watkins (Boise State University)

Download/Website: <https://physics.boisestate.edu/exoclipse/>

Contact: exoclipse@boisestate.edu

5 Conference reports

Proceedings of the First Greek-Austrian Workshop on Extrasolar Planetary Systems

T. I. Maindl¹, H. Varvoglis², R. Dvorak¹

¹ Department of Astrophysics, University of Vienna, Türkenschanzstrasse 17, A-1180 Vienna, Austria

² Sect. of Astrophysics, Astronomy and Mechanics, Dept. of Physics, Aristotle University of Thessaloniki, 54124, Greece

Refereed proceedings book now available, published March 15, 2017 (2017pfga.proc.....M)

We are happy to announce availability of the proceedings of the First Greek-Austrian Workshop on Extrasolar Planetary Systems which was held on the island of Ammouliani, Chalkidiki, Greece, September 18–25, 2016. Each paper went through an independent review; the proceedings have been accepted as refereed publication by ADS.

The participants' contributions illuminate many aspects of exoplanets and are separately listed in ADS:

- Circular periodic orbits, resonance capture and inclination excitation during type II migration
K. I. Antoniadou and G. Voyatzis
- Water transport to circumprimary habitable zones from icy planetesimal disks in binary star systems
D. Bancelin, E. Pilat-Lohinger, T. I. Maindl and Á. Baszó
- Analytical estimates of secular frequencies for binary star systems
Á. Baszó and E. Pilat-Lohinger
- Applicability and limits of simple hydrodynamic scaling for collisions of water-rich bodies in different mass regimes
C. Burger and C. M. Schäfer
- On a possible origin of the 9th planet
V. Doultsinou and H. Varvoglis
- Trojan twin planets
R. Dvorak, B. Loibnegger and R. Schwarz
- On the stability of the detected planet in the triple system HD 131399
B. Funk, E. Pilat-Lohinger, Á. Baszó and D. Bancelin
- A dynamical study on exocomets
B. Loibnegger and R. Dvorak
- Collisional water transport and water-loss relevant to formation of habitable planets
T. I. Maindl, C. M. Schäfer, N. Haghighipour, C. Burger and R. Dvorak
- On the dynamical habitability of Trojan planets in exoplanetary systems
R. Schwarz, B. Funk, Á. Baszó and S. Eggl
- Long-term dynamics of artificial Earth satellites
D. K. Skoulidou, A. J. Rosengren, K. Tsiganis and G. Voyatzis
- Periodic orbits of planets in binary systems
G. Voyatzis
- Collisional fragmentation of porous objects in planetary systems
O. J. Wandel, C. M. Schäfer and T. I. Maindl

Download/Website: <http://adsabs.harvard.edu/abs/2017pfga.proc.....Mhttps://www.amazon.com/dp/1544255632>

Contact: thomas.maindl@univie.ac.at

6 Jobs and positions

Postdoc position in planet formation

Anders Johansen

Lund Observatory, Lund University, Sweden

Lund University, 2017

Lund University invites applicants to a postdoc position in planet formation. The successful applicant will work within the PLANETESYS project that was recently funded by the European Research Council (PI: Anders Johansen). The overarching goal of the project is the development and exploitation of an N-body code to simulate the formation of planets, including growth by accretion of pebbles, planetesimals and gas. The project also concerns the chemical composition of planets and the delivery of life-essential molecules to habitable planets.

Researchers with an experience background in any area of theoretical or computational astrophysics or astrochemistry are invited to apply.

The position is initially time-limited to two years, but can be extended to three or four years, based on work progress.

Part of the research can consist of own, independent projects. Please contact Anders Johansen (anders@astro.lu.se) for details.

Application submission deadline: 31 May

Download/Website: <http://www.astro.lu.se/vacancies/>

Contact: anders@astro.lu.se

Research fellowship position in the field of stars and planetary systems

Sérgio G. Sousa

Institute of Astrophysics and Space Sciences, Porto, Portugal

Institute of Astrophysics and space sciences, Porto, Portugal, October 2017

The Centro de Investigação em Astronomia/Astrofísica da Universidade do Porto (CAUP) opens a call for one research fellowship in the field of Stars and Planetary Systems at the Institute of Astrophysics and space sciences (IA). The position is offered in the context of the project "Towards the precise characterization of Earth-like exoplanets" with financial support provided by the FCT (ref. IF/00028/2014/CP1215/CT0002).

Research work plan:

The successful candidate is expected to pursue research in the Stars and Planetary Systems field, and to provide support to our participation in planet search and characterization projects (namely CHEOPS/ESA, ESPRESSO/ESO, NIRPS/ESO, HIRES/ESO (E-ELT), and SPIROU/CFHT). The successful candidate is in particular expected to pursue research to improve the current methodologies for the characterization of low mass stars (M stars) and respective planets through the analysis of NIR high resolution spectroscopy. The candidate is expected to be enrolled in the Doctoral Program in Astronomy at University of Porto.

IA:

The Institute of Astrophysics and space sciences (IA) assembles more than two-thirds of all active researchers working in Space Sciences in Portugal, and is responsible for an even greater fraction of the national productivity in international ISI journals in this area. The research and development effort at the IA includes most of the topics at the forefront of research in Astrophysics and Space Sciences, complemented by work on instrumentation and systems with potential use in Astronomy and Astrophysics.

Download/Website: <http://www.iastro.pt/ia/jobDetails.html?ID=44>

Contact: Sergio.Sousa@astro.up.pt

PhD position: Constraining the Love-Number k_2 of Exoplanets

Dr. Szilárd Csizmadia

Institute of Planetary Research, DLR, Rutherfordstr. 2, 12489 Berlin

German Aerospace Center (DLR), Berlin, Germany, earliest starting date: 1 September 2017

The Institute of Planetary Research in Berlin explores the origin, evolution and development of planets, their moons, asteroids and comets of our Solar System and other planetary systems. Using spacecraft and earth-based remote sensing techniques, laboratory experiments, in-situ investigations and numerical modelling, the institute is well established within the national and international research community and industry.

At the Department of Extrasolar Planets and Atmospheres photometric time-series data are analyzed to detect and characterize exoplanets (mass, radius etc.) and their atmospheres; also, numerical models are developed to model their light curves and atmospheres.

The measurement of polar flattening of exoplanets and constraints on the Love-number can open a new dimension in the understanding of the planetary interiors.

Matter Under Planetary Interior Conditions (High Pressure, Planetary, and Plasma Physics) is a new Research Unit located in Rostock, Hamburg, Bayreuth and Berlin (Germany) and funded by the German Research Foundation. The scope of the Research Unit is aiming at an improved knowledge of the composition and interior structure of planetary interiors through an interdisciplinary approach, involving experiments, theory and modeling activities.

Here, the focus of this work will be on the construction of numerical light curve modeling code to measure the polar flattening of exoplanets and its applications to publicly available space-photometric light curves (CoRoT, Kepler, K2). The measured flattening quantity is then used to give constraints on the Love-number of the exoplanet. The code can be applied to observational data of future satellite missions such as CHEOPS and PLATO, too. The Research Unit as a whole, will give a particular emphasis on the derivation of scaling laws for exoplanets, relating mass, radius, thermal state, and equilibrium shape as induced by rotational and tidal distortions to each other.

It is expected that this position leads to the completion of a PhD.

Applications should be sent by 20 June 2017. Earliest starting date is 1 September 2017. Please attach up to two letters of reference, CV, motivation letter to your application.

Download/Website: <https://tinyurl.com/DLR-Love-number>

Contact: szilard.csizmadia@dlr.de

Postdoctoral position on exoplanet data analysis related to CHEOPS

Dr Monika Lendl

Space Research Institute, Graz, Austria, 1 September 2017

The Space Research Institute of the Austrian Academy of Sciences invites applications for a postdoctoral position related to observations of extrasolar planets. The institute, located in Graz (Austria), understands itself as the hub of space-related activities in Austria, participating in numerous space missions, including the upcoming exoplanet missions CHEOPS, CUTE and PLATO. It has recently established an observationally oriented research group dedicated to exoplanet characterization in the framework of these space missions and is also home to a theoretically oriented research group dedicated to the modeling of upper planetary atmospheres.

The successful candidate will work with Dr Monika Lendl on the preparation and exploitation of the CHEOPS space mission. The research, funded by the Austrian Research Promotion Agency (FFG), will relate to the optimization of data analysis methods for high-precision photometry, with particular regard to the interpretation of data in the presence of astrophysical and instrumental noise sources.

The applicant must hold a PhD in Astronomy, Astrophysics or related fields. Preference will be given to candidates with a strong background in statistical methods for data analysis. Experience related to the analysis of time-series photometry and its applications to extrasolar planets is an asset, but also candidates with a background on variable stars are encouraged to apply.

The appointment begins September 2017, and will be for two years. Salary will be Grade IV/2 according to the scale of the Austrian Academy of Sciences (41,582.8 Euro per year).

Applications should include 1) curriculum vitae, 2) list of publications, 3) statement of applicant's past and current research experience (max 2 pages), 4) academic certificates, and two letters of reference should be sent directly to monika.lendl@oeaw.ac.at.

Applications should be sent electronically via email to monika.lendl@oeaw.ac.at in a single PDF file. The closing date of applications is 1 July 2017.

The Austrian Academy of Sciences is an equal opportunity employer.

Download/Website: <http://geco.oeaw.ac.at>, <http://cheops.unibe.ch/>

Contact: monika.lendl@oeaw.ac.at

Researcher or engineering position on the CUTE CubeSat mission preparation

Luca Fossati

Space Research Institute, Austrian Academy of Sciences, Graz, Austria, October 2017

The institute invites applications for a researcher or engineering position at the Space Research Institute (IWF, Graz) in Austria to join the observational exoplanet group led by Dr Luca Fossati. The group concentrates on the multi-wavelength observational characterisation of exoplanet atmospheres, and in particular of planetary upper atmospheres, in the context of future space missions, such as CHEOPS and PLATO. The work, funded by the Austrian Research Promotion Agency (FFG), will be conducted in the context of the preparation of the CUTE CubeSat mission, in which the IWF exoplanet group is heavily involved at a scientific and engineering level.

The Colorado Ultraviolet Transit Experiment (CUTE) is a NASA CubeSat mission (PI: K. France; University of Colorado, Boulder) carrying on board a low-resolution ($R \sim 2500$) near-ultraviolet (2500–3500 Å) spectrograph, which will carry out transmission spectroscopy of the nearest short-period exoplanetary systems. CUTE, to be launched in 2020, will carry out a 1-year science mission with the main aim to study the physics of atmospheric escape.

The successful applicant is expected to carry out the study of CUTE's full optical system aiming at the characterisation of the satellite's science products outside of the nominal case. Further, the successful applicant is expected to adapt already available tools for the generation of simulated data to CUTE's characteristics. The synthetic data will be used to train the science team and prepare the data reduction pipeline.

The applicant must have proven experience with Zemax tools and good (C and/or C++) programming skills. Further experience with Astronomic data analyses is desired, but not necessary.

The appointment begins as early as October 2017, but not later than December 2017, and will be for two years, plus one possible year depending on performance and funding availability. Salary will be Grade IV/1 (about 38,000 Euro per year, gross), or Grade IV/2 (about 41,000 Euro per year, gross) for applicants with a PhD, according to the scale of the Austrian Academy of Sciences.

Applications include 1) curriculum vitae, 2) list of publications, 3) statement of applicant's past and current experience (max 2 pages), 4) academic certificates, and 5) names of two persons, who are willing to send letters of recommendation.

Applications should be sent electronically via email to luca.fossati@oeaw.ac.at in a single PDF file.

The closing date of applications is 1st of June 2017.

The Austrian Academy of Sciences is an equal opportunity employer and in particular invites women to apply.

Download/Website: <http://www.iwf.oeaw.ac.at/en/research/exo-planetary-physics/exoplanets/>

Contact: luca.fossati@oeaw.ac.at

7 As seen on astro-ph

The following list contains all the entries relating to exoplanets that we spotted on astro-ph during March and April 2017. If you see any that we missed, please let us know and we'll include them in the next issue.

March 2017

astro-ph/1703.00011 : **1 to 2.4 micron Near-IR spectrum of the Giant Planet β Pictoris b obtained with the Gemini Planet Imager** by *Jeffrey Chilcote et al.*

astro-ph/1703.00012 : **Accounting for Chromatic Atmospheric Effects on Barycentric Corrections** by *Ryan T. Blackman, et al.*

astro-ph/1703.00504 : **Strong HI Lyman- α variations from the 11 Gyr-old host star Kepler-444: a planetary origin ?** by *V. Bourrier, et al.*

- astro-ph/1703.00582 : **Observing Exoplanets with High Dispersion Coronagraphy. I. The scientific potential of current and next-generation large ground and space telescopes** by *Ji Wang, et al.*
- astro-ph/1703.00583 : **Observing Exoplanets with High-Dispersion Coronagraphy. II. Demonstration of an Active Single-Mode Fiber Injection Unit** by *Dimitri Mawet, et al.*
- astro-ph/1703.00843 : **CFBDSIR 2149-0403: young isolated planetary-mass object or high-metallicity low-mass brown dwarf?** by *P. Delorme, et al.*
- astro-ph/1703.00878 : **Enhanced interplanetary panspermia in the TRAPPIST-1 system** by *Manasvi Lingam, Abraham Loeb*
- astro-ph/1703.00883 : **Analysis Of Kepler-71 Activity Through Planetary Transit** by *Eber A. Gusmao, Caius L. Selhorst, Alexandre S. Oliveira*
- astro-ph/1703.00970 : **The shadow knows: using shadows to investigate the structure of the pretransitional disk of HD 100453** by *Zachary C. Long, et al.*
- astro-ph/1703.01424 : **Seven temperate terrestrial planets around the nearby ultracool dwarf star TRAPPIST-1** by *Michael Gillon, et al.*
- astro-ph/1703.01430 : **Two massive rocky planets transiting a K-dwarf 6.5 parsecs away** by *Michael Gillon, et al.*
- astro-ph/1703.01449 : **Accurate parameters for HD 209458 and its planet from HST spectrophotometry** by *Carlos del Burgo, Carlos Allende Prieto*
- astro-ph/1703.01512 : **The evolution of protoplanetary disks from their taxonomy in scattered light: Group I vs Group II** by *Antonio Garufi, et al.*
- astro-ph/1703.01817 : **The GTC exoplanet transit spectroscopy survey. VI. A spectrally-resolved Rayleigh scattering slope in GJ 3470b** by *G. Chen, et al.*
- astro-ph/1703.01857 : **On the origin of the wide-orbit circumbinary giant planet HD 106906: A dynamical scenario and its impact on the disk** by *L. Rodet, et al.*
- astro-ph/1703.02056 : **Transiting Planets with LSST III: Detection Rate per Year of Operation** by *Savannah R. Jacklin, et al.*
- astro-ph/1703.02447 : **The Effect of Multiple Heat Sources on Exomoon Habitable Zones** by *Vera Dobos, et al.*
- astro-ph/1703.02540 : **Exozodiacal clouds: Hot and warm dust around main sequence stars** by *Quentin Kral, et al.*
- astro-ph/1703.02562 : **Evidence for abnormal $H\alpha$ variability during near-transit observations of HD 189733 b** by *P. Wilson Cauley, Seth Redfield, Adam G. Jensen*
- astro-ph/1703.02607 : **Integral Field Spectroscopy of the Low-Mass Companion HD984B with the Gemini Planet Imager** by *Mara Johnson-Groh, et al.*
- astro-ph/1703.02630 : **Probing the atmosphere of a sub-Jovian planet orbiting a cool dwarf** by *Elyar Sedaghati et al.*
- astro-ph/1703.02656 : **Exoplanet Characterization by Multi-Observatory Transit Photometry with TESS and CHEOPS** by *E. Gaidos, D. Kitzmann, K. Heng*
- astro-ph/1703.03053 : **Impact Erosion Model for Gravity-Dominated Planetesimals** by *H. Genda, et al.*
- astro-ph/1703.03169 : **The Influences of Forming Companions on the Spectral Energy Distributions of Stars with Circumstellar Discs** by *Olga V. Zakhozay*
- astro-ph/1703.03414 : **Eclipse, transit and occultation geometry of planetary systems at exo-syzygy** by *Dimitri Veras, Elme Breedt*
- astro-ph/1703.03417 : **Mass, Density, and Formation Constraints in the Compact, Sub-Earth Kepler-444 System including Two Mars-Mass Planets** by *Sean M. Mills, Daniel C. Fabrycky*
- astro-ph/1703.03518 : **Evidence for a planetary mass third body orbiting the binary star KIC 5095269** by *A. K. Getley, et al.*
- astro-ph/1703.03622 : **Predicting radio emission from the newborn hot Jupiter V830 Tau and its host star** by *A. A. Vidotto, J.-F. Donati*

- astro-ph/1703.03634 : **Breaking the Chains: Hot Super-Earth systems from migration and disruption of compact resonant chains** by *Andre Izidoro, et al.*
- astro-ph/1703.03759 : **Orbital Evolution of Moons in Weakly Accreting Circumplanetary Disks** by *Yuri I. Fujii, et al.*
- astro-ph/1703.04166 : **A terrestrial-sized exoplanet at the snow line of TRAPPIST-1** by *Rodrigo Luger, et al.*
- astro-ph/1703.04296 : **Search for giant planets in M67 IV: survey results** by *A. Brucalassi, et al.*
- astro-ph/1703.04624 : **CO2 condensation is a serious limit to the deglaciation of Earth-like planets** by *Martin Turbet, et al.*
- astro-ph/1703.05033 : **Searching for planetary signals in Doppler time series: a performance evaluation of tools for periodograms analysis** by *M. Pinamonti, et al.*
- astro-ph/1703.05322 : **The VLT/NaCo large program to probe the occurrence of exoplanets and brown dwarfs at wide orbits. IV. Gravitational instability rarely forms wide, giant planets** by *A. Vigan, et al.*
- astro-ph/1703.05386 : **The HARPS search for southern extra-solar planets XLI. A dozen planets around the M dwarfs GJ 3138, GJ 3323, GJ 273, GJ 628, and GJ 3293** by *N. Astudillo-Defru, et al.*
- astro-ph/1703.05762 : **Searching for Exoplanets Around X-Ray Binaries with Accreting White Dwarfs, Neutron Stars, and Black Holes** by *Nia Imara, Rosanne Di Stefano*
- astro-ph/1703.05815 : **Assessing the Habitability of the TRAPPIST-1 System Using a 3D Climate Model** by *Eric T. Wolf*
- astro-ph/1703.05950 : **No correlation between the Transit-Depth Metallicity of Kepler gas giant confirmed and candidates planets: A Bayesian Approach** by *Cyrine Nehmé, Paula Sarkis*
- astro-ph/1703.06136 : **Reassessment of the Null Result of the HST Search for Planets in 47 Tucanae** by *Kento Masuda, Joshua N. Winn*
- astro-ph/1703.06477 : **A deeper view of the CoRoT-9 planetary system. A small non-zero eccentricity for CoRoT-9b likely generated by planet-planet scattering** by *A. S. Bonomo, et al.*
- astro-ph/1703.06582 : **The Apparently Decaying Orbit of WASP-12** by *Kishore C. Patra, Joshua N. Winn, Matthew J. Holman, Liang Yu, Drake Deming, Fei Dai*
- astro-ph/1703.06716 : **The GTC exoplanet transit spectroscopy survey. VII. Detection of sodium in WASP-52b's cloudy atmosphere** by *G. Chen, et al.*
- astro-ph/1703.06727 : **Circular periodic orbits, resonance capture and inclination excitation during type II migration** by *K. I. Antoniadou, G. Voyatzis*
- astro-ph/1703.06885 : **The Kepler-19 system: a thick-envelope super-Earth with two Neptune-mass companions characterized using Radial Velocities and Transit Timing Variations** by *Luca Malavolta, et al.*
- astro-ph/1703.06924 : **Formation of TRAPPIST-1 and other compact systems** by *Chris Ormel, Beibei Liu, Djoede Schoonenberg*
- astro-ph/1703.06936 : **The longevity of water ice on Ganymedes and Europas around migrated giant planets** by *Owen R. Lehmer, David C. Catling, Kevin J. Zahnle*
- astro-ph/1703.06947 : **The Star Blended with the MOA-2008-BLG-310 Source Is Not the Exoplanet Host Star** by *A. Bhattacharya, et al.*
- astro-ph/1703.07124 : **Growing into and out of the bouncing barrier in planetesimal formation** by *Maximilian Kruss, Jens Teiser, Gerhard Wurm*
- astro-ph/1703.07125 : **AMD-stability and the classification of planetary systems** by *Jacques Laskar, Antoine Petit*
- astro-ph/1703.07416 : **Characterizing K2 Candidate Planetary Systems Orbiting Low-Mass Stars II: Planetary Systems Observed During Campaigns 1-7** by *Courtney D. Dressing, et al.*
- astro-ph/1703.07585 : **The effect of the stellar absorption line centre-to-limb variation on exoplanet transmission spectrum observations** by *Fei Yan, et al.*
- astro-ph/1703.07623 : **OGLE-2013-BLG-1761Lb: A Massive Planet Around an M/K Dwarf** by *Y. Hirao, et al.*
- astro-ph/1703.07790 : **The Planetary Mass-Radius Relation and its Dependence on Orbital Period as Mea-**

- sured by Transit Timing Variations and Radial Velocities** by *Sean M. Mills, Tsevi Mazeh*
- astro-ph/1703.07895 : **Planetesimal formation by the streaming instability in a photoevaporating disk** by *Daniel Carrera, et al.*
- astro-ph/1703.07917 : **Distribution of captured planetesimals in circumplanetary gas disks and implications for accretion of regular satellites** by *Ryo Suetsugu, Keiji Ohtsuki*
- astro-ph/1703.08003 : **Nonlinear tidal flows in short-period planets** by *Adrian J. Barker*
- astro-ph/1703.08361 : **Synergies between Exoplanet Surveys and Variable Star Research** by *Geza Kovacs*
- astro-ph/1703.08426 : **The stability of tightly-packed, evenly-spaced systems of Earth-mass planets orbiting a Sun-like star** by *Alysa Obertas, Christa Van Laerhoven, Daniel Tamayo*
- astro-ph/1703.08546 : **An ALMA Survey of Protoplanetary Disks in the σ Orionis Cluster** by *Megan Ansdell, J. et al.*
- astro-ph/1703.08548 : **An Earth-mass Planet in a 1-AU Orbit around an Ultracool Dwarf** by *Y. Shvartzvald, et al.*
- astro-ph/1703.08560 : **Circumstellar discs: What will be next?** by *Quentin Kral, Cathie Clarke, Mark Wyatt*
- astro-ph/1703.08639 : **The Lowest Mass Ratio Planetary Microlens: OGLE 2016-BLG-1195Lb** by *I.A. Bond, et al.*
- astro-ph/1703.08647 : **Toward an initial mass function for giant planets** by *Daniel Carrera, Melvyn B. Davies, Anders Johansen*
- astro-ph/1703.08829 : **Outer Architecture of Kepler-11: Constraints from Coplanarity** by *Daniel Jontof-Hutter, et al.*
- astro-ph/1703.08884 : **Characterisation of the radial velocity signal induced by rotation in late-type dwarfs** by *A. Suárez Mascareño, et al.*
- astro-ph/1703.09000 : **Water transport to circumprimary habitable zones from icy planetesimal disks in binary star systems** by *D. Bancelin, et al.*
- astro-ph/1703.09010 : **EnVision: understanding why our most Earth-like neighbour is so different** by *Richard Ghail, et al.*
- astro-ph/1703.09132 : **Connecting HL Tau to the Observed Exoplanet Sample** by *Christopher Simbulan, et al.*
- astro-ph/1703.09225 : **Addressing the statistical mechanics of planet orbits in the solar system** by *Federico Mogavero*
- astro-ph/1703.09227 : **A Multi-Wavelength Analysis of Dust and Gas in the SR 24S Transition Disk** by *P. Pinilla, et al.*
- astro-ph/1703.09229 : **A Search for Lost Planets in the Kepler Multi-planet Systems and the Discovery of the Long-period, Neptune-sized Exoplanet Kepler-150 f** by *Joseph R. Schmitt, Jon M. Jenkins, Debra A. Fischer*
- astro-ph/1703.09285 : **A precise optical transmission spectrum of the inflated exoplanet WASP-52b** by *Tom Louden, et al.*
- astro-ph/1703.09348 : **A Herschel resolved debris disc around HD 105211** by *S. Hengst, et al.*
- astro-ph/1703.09388 : **New constraints on the millimetre emission of six debris disks** by *Jonathan P. Marshall, et al.*
- astro-ph/1703.09450 : **The influence of orbital resonances on the water transport to objects in the circumprimary habitable zone of binary star systems** by *D. Bancelin, E et al.*
- astro-ph/1703.09543 : **A decade of Ha transits for HD 189733 b: stellar activity versus absorption in the extended atmosphere** by *P. Wilson Cauley, Seth Redfield, Adam G. Jensen*
- astro-ph/1703.09708 : **Effects of disc midplane evolution on CO snowline location** by *O. Panic, M. Min*
- astro-ph/1703.09711 : **Evidence for Two Hot Jupiter Formation Paths** by *Benjamin E. Nelson, Eric B. Ford, Frederic A. Rasio*
- astro-ph/1703.09741 : **The Origin of Planetary Ring Systems** by *S. Charnoz, et al.*
- astro-ph/1703.09840 : **Properties of hydrogen, helium, and silicon dioxide mixtures in giant planet interiors** by *François Soubiran, et al.*

- astro-ph/1703.10046 : **Transit Probabilities in Secularly Evolving Planetary Systems** by *Matthew J. Read, Mark C. Wyatt, Amaury H. M. J. Triaud*
- astro-ph/1703.10130 : **Frequent flaring in the TRAPPIST-1 system - unsuited for life?** by *Krisztian Vida, et al.*
- astro-ph/1703.10250 : **A Low-Mass Exoplanet Candidate Detected By K2 Transiting the Praesepe M Dwarf JS 183** by *Joshua Pepper, et al.*
- astro-ph/1703.10273 : **Zonal Flow Magnetic Field Interaction in the Semi-Conducting Region of Giant Planets** by *Hao Cao, David J. Stevenson*
- astro-ph/1703.10292 : **Gravito-turbulence in irradiated protoplanetary discs** by *Shigenobu Hirose, Ji-Ming Shi*
- astro-ph/1703.10330 : **The Inner 25 AU Debris Distribution in the epsilon Eri System** by *Kate Y. L. Su et al.*
- astro-ph/1703.10375 : **The California-Kepler Survey. III. A Gap in the Radius Distribution of Small Planets** by *Benjamin J. Fulton, et al.*
- astro-ph/1703.10385 : **Size and density sorting of dust grains in SPH simulations of protoplanetary discs** by *Francesco C. Pignatale, et al.*
- astro-ph/1703.10400 : **The California-Kepler Survey. I. High Resolution Spectroscopy of 1305 Stars Hosting Kepler Transiting Planets** by *Erik A. Petigura, et al.*
- astro-ph/1703.10402 : **The California-Kepler Survey. II. Precise Physical Properties of 2025 Kepler Planets and Their Host Stars** by *John Asher Johnson, et al.*
- astro-ph/1703.10596 : **The Reversibility Error Method (REM): a new, dynamical fast indicator for planetary dynamics** by *Federico Panichi, Krzysztof Gozdzewski, Giorgio Turchetti*
- astro-ph/1703.10647 : **Testing connections between exo-atmospheres and their host stars. GEMINI-N/GMOS ground-based transmission spectrum of Qatar-1b** by *C. von Essen, et al.*
- astro-ph/1703.10653 : **Orbits for the Impatient: A Bayesian Rejection Sampling Method for Quickly Fitting the Orbits of Long-Period Exoplanets** by *Sarah Blunt, et al.*
- astro-ph/1703.10693 : **Predictions for the secondary CO, C and O gas content of debris discs from the destruction of volatile-rich planetesimals** by *Quentin Kral, et al.*
- astro-ph/1703.10769 : **MOA-2012-BLG-505Lb: A super-Earth mass planet in the Galactic bulge** by *Masayuki Nagakane, et al.*
- astro-ph/1703.10803 : **A revolution is brewing: observations of TRAPPIST-1 exoplanetary system fosters a new biomarker** by *M. Turbo-King, et al.*

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- astro-ph/1704.00202 : **Correlations between planetary transit timing variations, transit duration variations and brightness fluctuations due to exomoons** by *K.E. Naydenkin, D.S. Kaparulin*
- astro-ph/1704.00203 : **Absence of a metallicity effect for ultra-short-period planets** by *Joshua N. Winn, et al.*
- astro-ph/1704.00214 : **The Dispersal of Planet-forming discs: Theory confronts Observations** by *Barbara Ercolano, Ilaria Pascucci*
- astro-ph/1704.00317 : **From Exoplanets to Quasars: Adventures in Angular Differential Imaging** by *Mara Johnson-Groh*
- astro-ph/1704.00373 : **The GAPS Programme with HARPS-N@TNG XIV. Investigating giant planet migration history via improved eccentricity and mass determination for 231 transiting planets** by *A. S. Bonomo, et al.*
- astro-ph/1704.00495 : **Periodic orbits of planets in binary systems** by *George Voyatzis*
- astro-ph/1704.00539 : **Results from a set of three-dimensional numerical experiments of a hot Jupiter atmosphere** by *N. J. Mayne, et al.*
- astro-ph/1704.00787 : **A Close-up View of the Young Circumbinary Disk HD 142527** by *Y. Boehler, et al.*
- astro-ph/1704.01112 : **Multi-filter transit observations of HAT-P-3b and TrES-3b with multiple Northern Hemisphere telescopes** by *Davide Ricci, et al.*

- astro-ph/1704.01121 : **A companion on the planet/brown dwarf mass boundary on a wide orbit discovered by gravitational microlensing** by *R. Poleski, et al.*
- astro-ph/1704.01126 : **Tidal heating and stellar irradiation of Hot Jupiters** by *Adam S. Jermyn, Christopher A. Tout, Gordon I. Ogilvie*
- astro-ph/1704.01165 : **Post main sequence evolution of icy minor planets II: water retention and white dwarf pollution around massive progenitor stars** by *Uri Malamud, Hagai B. Perets*
- astro-ph/1704.01267 : **Formulas for Radial Transport in Protoplanetary Disks** by *Steven J. Desch, et al.*
- astro-ph/1704.01299 : **The fuzziness of giant planets' cores** by *Ravit Helled, David Stevenson*
- astro-ph/1704.01411 : **Fast litho-panspermia in the habitable zone of the TRAPPIST-1 system** by *Sebastiaan Krijt, et al.*
- astro-ph/1704.01541 : **Masses of Kepler-46b, c from Transit Timing Variations** by *Ximena Saad-Olivera, et al.*
- astro-ph/1704.01626 : **Gap formation by inclined massive planets in locally isothermal three-dimensional discs** by *R. O. Chametla, et al.*
- astro-ph/1704.01688 : **Worlds Without Moons: Exomoon Constraints for Compact Planetary Systems** by *Stephen R. Kane*
- astro-ph/1704.01724 : **MOA-2016-BLG-227Lb: A Massive Planet Characterized by Combining Lightcurve Analysis and Keck AO Imaging** by *Naoki Koshimoto, et al.*
- astro-ph/1704.01844 : **Connecting the shadows: probing inner disk geometries using shadows in transitional disks** by *M. Min, et al.*
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