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1 Editorial

Welcome to the sixteenth edition of ExoPlanet News, an electronic newsletter reporting the latest developments and research outputs in the field of exoplanets.

As with last month, it's good to see a range of exoplanet jobs advertised in this month's edition, along with the usual selection of fascinating recent journal articles. Please take note also of a couple of workshop announcements included here.

Remember that past editions of this newsletter, submission templates and other information can be found at the ExoPlanet News website: <http://exoplanet.open.ac.uk>. As ever, we rely on you, the subscribers of the newsletter, to send us your abstracts of recent papers, conference announcements, thesis abstracts, job adverts etc for each edition.

Please send anything relevant to exoplanet@open.ac.uk, and it will appear in the next edition. We plan to send out the next edition at the beginning of April 2009.

Best wishes

Andrew Norton & Glenn White
The Open University

2 Abstracts of refereed papers

Binarity of Transit Host Stars – Implications on Planetary Parameters

*S. Daemgen*¹, *F. Hormuth*¹, *W. Brandner*¹, *C. Bergfors*¹, *M. Janson*^{1,2}, *S. Hippler*¹, *Th. Henning*¹

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Astronomy & Astrophysics, in press (arXiv:0902.2179)

Context. Straight-forward derivation of planetary parameters can only be achieved in transiting planetary systems. However, planetary attributes such as radius and mass strongly depend on stellar host parameters. Discovering a transit host star to be multiple leads to a necessary revision of the derived stellar and planetary parameters.

Aims. Based on our observations of 14 transiting exoplanet hosts, we derive parameters of the individual components of three transit host stars (WASP-2, TrES-2, and TrES-4) which we detected to be binaries. Two of these have not been known to be multiple before. Parameters of the corresponding exoplanets are revised.

Methods. High-resolution “Lucky Imaging” with AstraLux at the 2.2 m Calar Alto telescope provided near diffraction limited images in i' and z' passbands. These results have been combined with existing planetary data in order to recalibrate planetary attributes.

Results. Despite the faintness ($\Delta\text{mag} \sim 4$) of the discovered stellar companions to TrES-2, TrES-4, and WASP-2, light-curve deduced parameters change by up to more than 1σ . We discuss a possible relation between binary separation and planetary properties, which—if confirmed—could hint at the influence of binarity on the planet formation process.

Download/Website: <http://arxiv.org/abs/0902.2179>

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On the protection of extrasolar Earth-like planets around K/M stars against galactic cosmic rays

J.-M. Grießmeier^{1,2}, A. Stadelmann³, J. L. Grenfell^{4,5}, H. Lammer⁶, U. Motschmann³

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⁵ Zentrum für Astronomie und Astrophysik, Technische Universität Berlin (TUB), Hardenbergstr. 2, 12489 Berlin, Germany

⁶ Space Research Institute, Austrian Academy of Sciences, Schmiedlstr. 6, A-8042 Graz, Austria

Icarus, published (2009*Icar.*199..526G)

Previous studies have shown that extrasolar Earth-like planets in close-in habitable zones around M-stars are weakly protected against galactic cosmic rays (GCRs), leading to a strongly increased particle flux to the top of the planetary atmosphere. Two main effects were held responsible for the weak shielding of such an exoplanet: (a) For a close-in planet, the planetary magnetic moment is strongly reduced by tidal locking. Therefore, such a close-in extrasolar planet is not protected by an extended magnetosphere. (b) The small orbital distance of the planet exposes it to a much denser stellar wind than that prevailing at larger orbital distances. This dense stellar wind leads to additional compression of the magnetosphere, which can further reduce the shielding efficiency against GCRs. In this work, we analyze and compare the effect of (a) and (b), showing that the stellar wind variation with orbital distance has little influence on the cosmic ray shielding. Instead, the weak shielding of M star planets can be attributed to their small magnetic moment. We further analyze how the planetary mass and composition influence the planetary magnetic moment, and thus modify the cosmic ray shielding efficiency. We show that more massive planets are not necessarily better protected against galactic cosmic rays, but that the planetary bulk composition can play an important role.

Download/Website: <http://dx.doi.org/10.1016/j.icarus.2008.09.015>

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Detection of water ice grains on the surface of the circumstellar disk around HD 142527

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Astrophysical Journal Letters, published (2009*ApJ*...690L.110H)

Coronagraphic imaging for a Herbig Ae star, HD 142527, was performed using Coronagraphic Imager with Adaptive Optics (CIAO) on the 8.2m Subaru Telescope. The images were obtained in the H_2O ice filter ($\lambda=3.08\ \mu\text{m}$) using adaptive optics (AO), and in the L' band without AO. Combining these data with previous observational results in the H and K bands, we derived the spectra of the scattered light from the circumstellar disk around HD 142527 and detected an H_2O ice absorption feature in the spectra. This result can be explained by the presence of silicate and H_2O ice grains of $\sim 1\ \mu\text{m}$ in size, according to the prediction model by Inoue et al. (2008). This grain

size is consistent with previous observational study. The present result demonstrates that high-resolution imaging of disk scattered light in the ice band is useful for detecting H₂O ice grain distributions in circumstellar disks.

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Photometric and spectroscopic detection of the primary transit of the 111-day-period planet HD 80606b

C. Moutou¹, G. Hébrard², F. Bouchy^{2,3} et al.

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Astronomy & Astrophysics Letters, submitted (astro-ph-0902.4457)

We report the detection of the primary transit of the extra-solar planet HD 80606 b, thanks to photometric and spectroscopic observations performed at Observatoire de Haute-Provence, simultaneously with the CCD camera at the 120-cm telescope and the SOPHIE spectrograph at the 193-cm telescope. We observed in both datasets the whole egress of the transit and partially its central part, with the same timings. The ingress occurred before sunset and was not observed. The full duration of the transit is between 9.5 and 17.2 hours. The data allows the planetary radius to be measured ($R_p = 0.86 \pm 0.10 R_{Jup}$) and other parameters of the system to be refined. Radial velocity measurements show the detection of a prograde Rossiter-McLaughlin effect, and provide a hint for a spin-orbit misalignment. If confirmed, this misalignment would corroborate the hypothesis that HD 80606 b owes its unusual orbital configuration to Kozai migration. HD 80606 b is by far the transiting planet on the longest period detected today. Its radius reinforces the observed relationship between the planet radius and the incident flux received from the star. Orbiting a quite bright star ($V = 9$), it opens opportunities to numerous follow-up studies.

Ten New and Updated Multiplanet Systems, and a Survey of Exoplanetary Systems

J. T. Wright¹, S. Upadhyay², G. W. Marcy², D. A. Fischer³, Eric B. Ford⁴, John Asher Johnson⁵

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Astrophysical Journal, in press

We present the latest velocities for ten multiplanet systems, including a re-analysis of archival Keck and Lick data, resulting in improved velocities that supersede our previously published measurements. We derive updated orbital fits for ten Lick and Keck systems, including two systems (HD 11964, HD 183263) for which we provide confirmation of second planets only tentatively identified elsewhere, and two others (HD 187123 and HD 217107) for which we provide a major revision of the outer planet's orbit. We compile orbital elements from the literature to generate a catalog of the 28 published multiple-planet systems around stars within 200 pc. From this catalog we find several intriguing patterns emerging:

- Including those systems with long-term radial velocity trends, at least 28% of known planetary systems appear to contain multiple planets;
- Planets in multiple-planet systems have somewhat smaller eccentricities than single planets; and

- The distribution of orbital distances of planets in multiplanet systems and single planets are inconsistent: single- planet systems show a pileup at $P \sim 3$ days and a jump near 1 AU, while multiplanet systems show a more uniform distribution in log-period.

In addition, among all planetary systems we find the following:

- There may be an emerging, positive correlation between stellar mass and giant-planet semimajor axis.
- Exoplanets more massive than Jupiter have eccentricities broadly distributed across $0 < e < 0.5$, while lower mass exoplanets exhibit a distribution peaked near $e = 0$.

Download/Website: <http://www.iop.org/EJ/journal/apj> <http://lanl.arxiv.org/abs/0812.1582>

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Molecular hydrogen in the disk of the Herbig Ae star HD 97048

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Astrophysical Journal, in press

We present high-resolution spectroscopic mid-infrared observations of the circumstellar disk around the Herbig Ae star HD 97048 obtained with the *VLT Imager and Spectrometer for the mid-InfraRed (VISIR)*. We conducted observations of mid-infrared pure rotational lines of molecular hydrogen (H_2) as a tracer of warm gas in the disk surface layers. In a previous paper, we reported the detection of the S(1) pure rotational line of H_2 at $17.035 \mu\text{m}$ and argued it is arising from the inner regions of the disk around the star. We used VISIR on the VLT for a more comprehensive study based on complementary observations of the other mid-infrared molecular transitions, namely S(2) and S(4) at $12.278 \mu\text{m}$ and $8.025 \mu\text{m}$ respectively, to investigate the physical properties of the molecular gas in the circumstellar disk around HD 97048. We do not detect neither the S(2) line nor the S(4) H_2 line from the disk of HD 97048, but we derive upper limits on the integrated line fluxes which allows us to estimate an upper limit on the gas excitation temperature, $T_{ex} < 570$ K. This limit on the temperature is consistent with the assumptions previously used in the analysis of the S(1) line, and allows us to set stronger constraints on the mass of warm gas in the inner regions of the disk. Indeed, we estimate the mass of warm gas to be lower than $0.1 M_{\text{Jup}}$. We also discuss the probable physical mechanisms which could be responsible of the excitation of H_2 in the disk of HD 97048.

Contact: claire.martin-zaidi@obs.ujf-grenoble.fr

3 Conference announcements

2009 Sagan Exoplanet Summer Workshop: Exoplanetary Atmospheres

Dr. Dawn M. Gelino

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

Pasadena, CA, July 20-24, 2009; Financial Support Deadline: March 13, 2009

This is your last chance to apply for financial support to attend the 2009 Sagan Exoplanet Workshop on Exoplanetary Atmospheres! Applications are due Friday, March 13, 2009.

The 2009 Sagan Exoplanet Summer Workshop: "Exoplanetary Atmospheres", will take place on the Caltech campus July 20 - 24. The workshop will consist of a series of tutorial and scientific lectures covering planetary atmosphere theory, what we have learned about exoplanetary atmospheres thus far, observational techniques, connections between exoplanets and planetary science, observational opportunities and challenges, and future prospects.

More information, including a draft agenda and instructions on applying for financial assistance to attend the workshop (applications due March 13), can be found on the workshop website: <http://nexsci.caltech.edu/workshop/2009/>

All attendees must register for the workshop at the above URL. Register before June 5 to take advantage of the early registration fee!

Registration Fee includes:

- Conference attendance, materials, and internet access
- Transportation between Pasadena Hilton and Workshop on Workshop Dates
- Box lunches on Monday, Wednesday and Friday
- Light breakfast each day of the workshop
- Snacks and drinks during morning and afternoon breaks each day of the workshop
- Opening reception Registration and Snacks
- 1 ticket to attend workshop dinner on Thursday (extra tickets will be available for purchase)
- 1 ticket to attend tour of Griffith Observatory on Wednesday afternoon (extra tickets will be available for purchase)

Download/Website: <http://nexsci.caltech.edu/workshop/2009/index.shtml>

Contact: sagan_workshop@ipac.caltech.edu

ESF Exploratory workshop (ESFEW) on 'Biosignatures on exoplanets: The identity of life'

Prof. N.J. Mason

Department of Physics and Astronomy, The Open University, Walton Hall, Milton Keynes, MK7 6AA, United Kingdom

Headquarters of the European Physical Society (EPS) in Mulhouse, France, June 22nd – 26th, 2009

ESFEWs are highly focussed meetings limited to a maximum of some 30 participants who are drawn from different disciplines to discuss a topical subject, commonly one that is in its infancy, with the aim of providing a forward look to the field and discuss new avenues of research that may benefit from closer, multidisciplinary, collaboration. Many ESFEW topics have progressed to form the basis of ESF Research Programmes and EU Framework grants. This workshop is part of the larger EU Europlanet programme.

This workshop aims to discuss what are the most promising candidates for biosignatures and to discuss possible methods and technologies for identifying them in the atmosphere and surface of exoplanets.

Download/Website: <http://www.esf.org/activities/exploratory-workshops/physical-and-engineering-sciences-pesc/workshops-detail.html?ew=7921>

Contact: n.j.mason@open.ac.uk

4 Jobs and positions

PhD Position on the Early Stages of Planet Formation

M. Spaans¹ & C.W. Ormel²

¹ Kapteyn Astronomical Institute, University of Groningen, Netherlands

² Max Planck Institute for Astronomy in Heidelberg, Germany

Groningen, deadline:, May 1 2009

At the Kapteyn Astronomical Institute of the University of Groningen a 4-year graduate position is available within the interstellar matter group, under supervision of Prof. M. Spaans and Dr. C.W. Ormel.

One of the key aspects of planet formation is the coagulation of dust particles into larger structures within a protoplanetary dusty gas disk. The dust aggregates are coupled, in a size-dependent manner, to the gas by turbulent motions and can settle into the disk mid-plane where meter and larger sizes may be reached. At a later evolutionary stage, gravitational run-away growth leads to planet formation; either through dust disk instabilities or through the presence of large (km-sized) planetesimals. This research focuses on the role of charges in the early stages of planet formation.

Hard radiation like X-rays and cosmic rays leads to charges in the gas and dust components, whereas collisions between grains lead to charge exchange. A distribution of charges on grains affects their collision rates, resulting in a qualitatively different coagulation compared to neutral dust grains. Furthermore, the degree of ionization in the disk determines whether the magneto-rotational instability operates, which has important implications for the transport of dust particles and gas throughout the disk. The candidate is expected to develop a coherent framework for the role of charges in these physical processes.

The position is open to students of all nationalities with the equivalent of a Master degree in astronomy or physics, and candidates with a genuine interest in theoretical astrophysics are particularly encouraged to apply. Applications should contain a curriculum vitae (with a list of university courses and grades), a brief statement of research experience and two letters of reference; to be sent via email or regular post. Selection of candidates will commence on

May 1 2009 and will continue until the position is filled. The starting date for the position is flexible. Please send applications to:

Prof. M. Spaans, Kapteyn Astronomical Institute, P.O. Box 800, 9700 AV Groningen, The Netherlands.

Download/Website: <http://www.astro.rug.nl/ismgroup/>

Contact: spaans@astro.rug.nl

Post Doctoral Research Associate in Exoplanet Astronomy

Carole Haswell

Department of Physics & Astronomy, The Open University, Walton Hall, Milton Keynes, MK7 6AA

Astronomy Research Group, The Open University, send applications by 7th April 2009

Applications are invited for a postdoctoral position in Characterisation of Transiting Exoplanets working with Dr Carole Haswell and collaborators in the Department of Physics & Astronomy at The Open University.

The appointee will:

- contribute to our ongoing programme of HST observations
- develop and undertake further exoplanet observations
- participate in related modelling of exoplanet atmospheres and structure

Applicants should hold or expect to gain a PhD in astrophysics or a related area, and must have strong skills in observational data analysis, design and planning of observations, and scientific programming on a unix-based operating system, ideally with some familiarity with IDL. A background in Exoplanet Research is strongly preferred; experience of working with HST Phase II proposals and/or analysing HST data is desirable.

If you wish to discuss this post informally, please contact Dr Carole Haswell, telephone +44 1908 653396 or e-mail c.a.haswell@open.ac.uk and/or Mrs Tracey Moore, Dept Office Manager, telephone +44 1908 653229 or e-mail t.j.moore@open.ac.uk.

Applications should include a CV, List of Publications, a short OU application form and a cover letter. Detailed information and how to apply will be posted at www3.open.ac.uk/employment, call the Recruitment Co-ordinator on 01908 653229 or email t.j.moore@open.ac.uk quoting the reference number 5505. Closing date 7th April 2009. Interviews will be held on 28th April 2009 and will include seminar presentations of the candidates' research.

Salary: £27183 – £31513 p.a.

Fixed term contract until April 2012

Download/Website: <http://www3.open.ac.uk/employment>

Contact: C.A.Haswell@open.ac.uk

3-yr PDRA on extra-solar planets at the University of Exeter

Suzanne Aigrain, Frédéric Pont

School of Physics, Stocker Road, Exeter, Ex4 4QL, UK

Astrophysics Group, University of Exeter, send applications by 15th April 2009

The University of Exeter intends to appoint a post-doctoral researcher in the field of transiting extra-solar planets, to work with Suzanne Aigrain and Frederic Pont in the School of Physics (Astrophysics Group). The successful applicant will use space-based facilities including CoRoT and HST in conjunction with complementary ground-based observations, in particular high-resolution spectroscopy, to detect, characterise and/or study the atmospheres of transiting extra-solar planets. They will be encouraged to collaborate with other members of the Astrophysics Group, which numbers approximately 35 staff, postdocs and graduate students working in theoretical and observational studies of star formation and extra-solar planets.

Applicants with a background in observational studies of extra-solar planets are particularly encouraged to apply; strong applicants from other areas will be considered. Applicants must hold, or expect to hold before taking up the position, a PhD (or equivalent) in Astrophysics or another relevant discipline.

A CV, list of publications, and a brief description of research interests and accomplishments should be submitted electronically to Dr. Suzanne Aigrain (S.Aigrain@exeter.ac.uk). Applicants should additionally arrange for three letters of recommendation to be sent to the same address. Applications received by April 15, 2009, will receive full consideration, but further applications will be considered until the post is filled.

This is a fixed-term appointment for 3 years, starting between May and October 2009. The starting salary will be in the range £24,152–£26,391 pa, depending on qualifications and experience.

The University of Exeter is an equal opportunity employer and promotes diversity in its workforce and, whilst all applicants will be judged on merit alone, is particularly keen to consider applications from groups currently underrepresented in the workforce.

Contact: S.Aigrain@exeter.ac.uk

Head of OCA/FIZEAU Dept, France

OCA-CNRS-UNS, D. Mourard

FIZEAU Lab, OCA-CNRS-UNS, F

Nice, F, before 1/1/2010

The function of Director of Laboratory A.H. Fizeau is vacant from April 1, 2009. The direction by interim will be ensured by one of the two current deputy managers until the date of final appointment of the new director (envisaged at the latest 1/1/2010). Within the framework of the current four-year contract, this direction court until the 31/12/2011. During the year 2010, the director will have, among other responsibilities, to prepare the new four-year contract over the period 2012-2015. In order to facilitate the search for candidates, a committee of search for candidatures is set up. The people interested by the function are invited to contact one or the other of the members of this committee. The candidates' application including a curriculum vitae, a notice of the titles and work, a list of publications and a letter of motivation, are to be addressed to the President of the committee before the 15/05/2009. Be aware that we do not have any official funding support at that time for this position but any application will be considered and solutions will be examined.

The Laboratory A. H. Fizeau is a CNRS laboratory (UMR 6525) dependent on 3 organizations: the Centre National de la Recherche Scientifique, the Observatoire de la Côte d'Azur and the University of Nice Sophia-Antipolis. The personnel is currently working on 3 sites: Nice Observatory, Nice University and Grasse. The current funded

contract Etat-Région aims at the regrouping the laboratory in Nice University in 2011.

The Fizeau laboratory was born from the fusion which took place on January 1, 2008 between the Laboratoire d'Astrophysique of the Nice University (UMR 6525) and the component Stellar Physics and High Angular Resolution of laboratory GEMINI (UMR 6203) of OCA. This union makes it possible to gather within the same laboratory all the actors of the High Angular Resolution on the french Riviera with also complementary skills developed in Atmospheric Optics and Signal processing, but also of theoretical and observational work completed in stellar, solar physics and in exo planets field.

Among the main activities of the laboratory, one can found, 1) The SPHERE instrument for the VLT: simulation of the instrument with CAOS, development and realization of the Lyot apodized coronagraphs, algorithms of processing of data, 2) Design and the realization of the MATISSE beam combiner, instrument of 2nd generation of the VLTI, 3) Design and exploitation of VEGA (spectro-polarimeter in the visible) in collaboration with the californian interferometer CHARA, 4) Exploitation of AMBER, spectro-interferometric instrument whose design and realization were supervised by the laboratory and 5) the laboratory preserves its heart of pioneer with astronomy in the Antarctic where it is in charge of the qualification of the site at Dome C. Fizeau has moreover the responsibility for the European network of astronomy in the Antarctic ARENA.

To conclude these various projects, the laboratory developed and concentrates an intense activity of Research and Development upstream of the instrumental projects. The Fizeau laboratory takes an active part also in the university education since the 1st year of licence until the doctorate and an astrophysical course is done in MASTER.

Hundred people are almost in the Laboratory today: 43 researchers and teacher-researchers, 37 engineers including 6 administrative, 16 PhD students, 5 post-docs and visitors.

Composition of the committee:

- J.B. DABAN, jean-baptiste.daban@unice.fr
- C. CATALA, Claude.Catala@obspm.fr
- D. MARY, david.mary@unice.fr
- D. MOURARD, denis.mourard@oca.eu
- F. THEVENIN, frederic.thevenin@oca.eu

Download/Website: <http://fizeau.oca.eu>

Contact: denis.mourard@obs-azur.fr

5 As seen on astro-ph

The following list contains all the entries relating to exoplanets that we spotted on astro-ph during February 2009. If you spot any that we missed, please let us know and we'll include them in the next issue.

Exoplanets

astro-ph/0902.0052: **Terrestrial planet formation in low eccentricity warm-Jupiter systems** by *M. J. Fogg & R. P. Nelson*

- astro-ph/0902.0597: **HD45364, a pair of planets in a 3:2 mean motion resonance** by *A.C.M. Correia, S. Udry, M. Mayor et al.*
- astro-ph/0902.0667: **HD60532, a planetary system in a 3:1 mean motion resonance** by *J. Laskar & A.C.M. Correia*
- astro-ph/0902.0737: **Exoplanetary Spin-Orbit Alignment: Results from the Ensemble of Rossiter-McLaughlin Observations** by *Daniel C. Fabrycky & Joshua N. Winn*
- astro-ph/0902.0952: **On the protection of extrasolar Earth-like planets around K/M stars against galactic cosmic rays** by *J.-M. Griessmeier, A. Stadelmann, J. L. Grenfell et al.*
- astro-ph/0902.1542: **Near-infrared transit photometry of the exoplanet HD 149026b** by *Joshua A. Carter, Joshua N. Winn, Ronald Gilliland et al.*
- astro-ph/0902.2179: **Binarity of Transit Host Stars - Implications on Planetary Parameters** by *S. Daemgen, F. Hormuth, W. Brandner et al.*
- astro-ph/0902.2576: **How and When do Planets Form? The Inner Regions of Planet Forming Disks at High Spatial and Spectral Resolution** by *R. Millan-Gabet & John D. Monnier*
- astro-ph/0902.2583: **Relative photometry of transiting exoplanet CoRoT-Exo-2b** by *Peter Veress, Jan Budaj, Jozef Vilagi et al.*
- astro-ph/0902.2651: **The low density transiting exoplanet WASP-15b** by *R. G. West, D. R. Anderson, M. Gillon et al.*
- astro-ph/0902.2779: **Formation, Survival, and Detectability of Planets Beyond 100 AU** by *Dimitri Veras, Justin R. Crepp, Eric B. Ford*
- astro-ph/0902.2998: **The Formation and Architecture of Young Planetary Systems** by *Charles Beichman, Isabelle Baraffe, Christopher Crockett et al.*
- astro-ph/0902.3000: **A Census of Exoplanets in Orbits Beyond 0.5 AU via Space-based Microlensing** by *David P. Bennett, J. Anderson, J.-P. Beaulieu et al.*
- astro-ph/0902.3374: **Chemical abundances of 451 stars from the HARPS GTO planet search program: Thin disc, thick disc, and planets** by *V. Neves, N. C. Santos, S. G. Sousa et al.*
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