Kaustubh Hakim

Scientific Researcher / Research Expert

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Employment

02.2023 – present	**Research Expert (staff member, 0.5 FTE)**, University of Leuven (KU Leuven), Leuven, Belgium
02.2023 – present	**Scientific Researcher (work leader, 0.5 FTE)**, Royal Observatory of Belgium, Brussels, Belgium
02.2019 – 01.2023	**Postdoctoral Researcher**, University of Bern, Bern, Switzerland
09.2014 – 12.2018	**PhD Candidate**, University of Amsterdam, Amsterdam, Netherlands
07.2014 – 08.2014	**Summer Researcher**, Nicolaus Copernicus Astronomical Center, Warsaw, Poland
07.2010 – 08.2012	**Analyst**, Nomura Investment Bank, Mumbai, India
05.2009 – 07.2009	**Intern**, IBM, Bangalore, India

Career Break

02.2024 – 03.2024	**Paternity Leave**, Belgium

Education

University of Amsterdam / VU Amsterdam — *Amsterdam, Netherlands*
PhD, Astrophysics & Geochemistry (awarded on 18.12.2018) — ***12.2018***

KU Leuven — *Leuven, Belgium*
MSc, Astronomy & Astrophysics — ***07.2014***

Indian Institute of Technology Kharagpur — *Kharagpur, India*
BTech, Electronics Engineering — ***07.2010***

Awards & Distinctions

2023	**BELSPO FED-tWIN Research Program, Belgium**, Career Award
2021	**NCCR PlanetS, Switzerland**, Research Project Grant
2021	**Swiss Society of Astronomy & Astrophysics**, Travel Award
2020	**University of Bern**, Young Academics Support Award
2014	**KU Leuven**, MSc with *magna cum laude*
2010	**IIT Kharagpur**, BTech with *Honours*
2006	**Engineering Entrance Examination, India**, 99.97 %tile among 0.5 million candidates

Publications

Hakim, K., Bower, D.J., Seidler, F., Sossi, P.A. **(2025)**. Silane–Methane Competition in Sub-Neptune Atmospheres as a Diagnostic of Metallicity and Magma Oceans. [arXiv]

Konings, T., Heinke, L., Baeyens, R., **Hakim, K.**, Christiaens, V., Decin, L. **(2025)**. Reliability of 1D radiative-convective photochemical-equilibrium retrievals on transit spectra of WASP-107b *Astronomy & Astrophysics* [journal] [arXiv]

Bower, D.J., Thompson, M.A., **Hakim, K.**, Tian, M., Sossi, P.A. **(2025)**. Interior Controls on the Habitability of Rocky Planets. *The Astrophysical Journal* [arXiv]

Höning, D., Carone, L., Baumeister, P., Chubb, K.L., Grenfell, J.L., **Hakim, K.**, Iro, N., Taysum, B., Tosi, N. **(2025)**. The effect of a biosphere on the habitable timespan of stagnant-lid planets and implications for the atmospheric spectrum.

Astronomy & Astrophysics 693, A205 [journal] [arXiv]

Hakim, K. (2024). Positive Weathering Feedback Compensates Carbonates at Shallow Ocean Depths, IAU Symposium, Vol. 382 (2024) pp. 123–125 [journal]

Gillmann, C., **Hakim, K.**, Lourenco, D., Quanz, S., Sossi, P. **(2024)**. Interior Controls on the Habitability of Rocky Planets. *Space: Science & Technology 4, 0075* [journal] [arXiv]

Narang, M., Oza, A. V., **Hakim, K.**, Puravankara, M., Tyagi., H., Banerjee, B., Surya, A., Nayak. P.K., Banyal, R.K., Thorngren, D.P. **(2023)**, uGMRT observations of the hot-Saturn WASP 69b: Radio-Loud Exoplanet-Exomoon Survey II (RLEES II), *Monthly Notices of the Royal Astronomical Society 522, 2* [journal] [arXiv]

Konrad, B.S., Alei, E., Quanz, S.P., Mollière, P., Angerhausen, D., Fortney, J.J., **Hakim, K.,** Jordan, S., Kitzmann, D., Rugheimer, S., Shorttle, O., Wordsworth, R., and the LIFE Collaboration **(2023)**, Large Interferometer For Exoplanets (LIFE): IX. Assessing the impact of clouds on atmospheric retrievals at mid-infrared wavelengths with a Venus-twin exoplanet, *Astronomy & Astrophysics* [journal] [arXiv]

Hakim, K., Tian, M., Bower, D.J., Heng. K. **(2023)**, Diverse Carbonates in Exoplanet Oceans Promote the Carbon Cycle, *Astrophysical Journal Letters 942, L20* [journal] [arXiv]

Narang, M., Oza, A. V., **Hakim, K.**, Puravankara, M., Banyal, R., Thorngren, D. **(2023)**, Radio-Loud Exoplanet-Exomoon Survey (RLEES): GMRT Search for Cyclotron Maser Emission, *Astronomical Journal 165, 1* [journal] [arXiv]

Bower, D. J., **Hakim, K.**, Sossi, P. A., Sanan, P. **(2022)**, Retention of water in terrestrial magma oceans and carbon-rich early atmospheres, *Planetary Science Journal 3, 93* [journal] [arXiv]

Hakim, K., Bower, D. J., Tian, M., Deitrick, R., Auclair-Desrotour, P., Kitzmann, D., Dorn, C., Mezger, K., Heng, K. **(2021)**, Lithologic Controls on Silicate Weathering Regimes of Temperate Planets, *Planetary Science Journal 2, 49* [journal] [arXiv]

Hakim, K., van den Berg, A., Vazan, A., Höning, D., van Westrenen, W., Dominik, C. **(2019)**, Thermal evolution of rocky exoplanets with a graphite outer shell, *Astronomy & Astrophysics 630, A152* [journal] [arXiv]

Hakim, K., Spaargaren, R., Grewal D.S., Rohrbach A., Brendt J., Dominik, C., van Westrenen, W. **(2019)**, Mineralogy, structure and habitability of carbon-enriched rocky exoplanets: A laboratory approach, *Astrobiology 19, 7* [journal] [arXiv]

Hakim, K., van Westrenen, W., Dominik, C. **(2018)**, Capturing the oxidation of silicon carbide in rocky exoplanetary interiors, *Astronomy & Astrophysics 618, L6* [journal] [arXiv]

Hakim, K., Rivoldini, A., Van Hoolst, T., Cottenier, S., Jaeken, J., Chust, T., Steinle-Neumann, G. **(2018)**, A new ab initio equation of state of hcp-Fe and its application to the interior structure and mass-radius relation of rocky super-Earths, *Icarus 313, 61—78* [journal] [arXiv]

Selected Presentations

Hakim, K. (2025, contributed talk), The Need for a Multi-Disciplinary Approach for Unravelling the Chemistry of Sub-Neptunes, *Smashing It Workshop, Leeds, United Kingdom*

Hakim, K. (2024, invited talk), Exoplanet Ocean Chemistry Under Carbonate-Silicate Cycling, *Venus Workshop, Austrian Academy of Sciences, Graz, Austria*

Hakim, K. (2024, contributed talk), Magma-Atmosphere Coupling of Hot Sub-Neptunes, *Ariel Consortium Meeting, Lisbon, Portugal*

Hakim, K. (2024, contributed talk), Magma-Atmosphere Coupling of Sub-Neptune Exoplanets, *Geologica Belgica Luxembourga Meeting, Liege, Belgium*

Hakim, K. (2024, invited seminar), Magma-Atmosphere Coupling in Hot Sub-Neptunes, *Institute for Particle Physics and Astrophysics, ETH Zurich, Switzerland*

Hakim, K. (2024, contributed talk), Impact of Magma-Atmosphere Coupling on Sub-Neptune Populations, *COST Action PLANETS Kick-Off, Torun, Poland*

Hakim, K. (2024, contributed poster), Sub-Neptune populations from magma-atmosphere coupling, *Exoplanets-5 Conference 2024, Leiden, Netherlands*

Hakim, K. (2024, invited talk), The Need for Ab Initio and Laboratory Simulations in Exoplanet Science, *Netherlands Astronomers' Conference 2024, Egmond aan Zee, Netherlands*

Hakim, K. (2024, invited lecture), Chemical Diversity in Rocky Exoplanets & Sub-Neptunes from Laboratory and Ab Initio Simulations *2024 ATSOA Summer Training School, ARIES, Nainital, India*

Hakim, K. (2024, invited seminar), Chemical Diversity in Rocky Interiors and Interior-Atmosphere Interactions, *Exoplanet Seminar Series, NASA Goddard Space Flight Center, USA (virtual)*

Hakim, K. (2023, invited lecture), Chemistry of Rocky Worlds and Sub-Neptunes, *ATOMIUM Meeting, KU Leuven, Belgium*

Hakim, K. (2023, invited review talk), Astronomical Windows into Planetary Interiors and Evolution, *Strange New Worlds Exoplanet Conference, IISER Pune, India*

Hakim, K. (2023, invited talk), Impact of Refractory Carbon on Rocky Exoplanet Mineralogy, Evolution & Habitability, *VLTI MATISSE Science Team Meeting (virtual)*

Hakim, K. (2022, invited talk), Chemically-Diverse Exoplanet Interiors and Interior-Atmosphere Interactions, *NOVA NW2 Meeting, Groningen, Netherlands (virtual)*

Hakim, K. (2022, invited talk), Carbon and Sulfur in Exoplanetary Interiors, *HP4 Workshop, Brussels, Belgium*

Hakim, K. (2022, invited review talk), Exoplanetary Interiors and Evolution, *PFE-SPP1992 joint meeting, Berlin, Germany*

Hakim, K. (2022, invited seminar), Chemistry of Planetary Interiors and Surfaces, *National Institute of Science Education and Research, Bhubaneswar, India*

Hakim, K., Bower, D. J., Tian, M., Deitrick, R., Auclair-Desrotour, P., Kitzmann, D., Dorn, C., Mezger, K., Heng, K. **(2021, contributed talk)**, A Lithology-based Silicate Weathering Model for Earth-like Planets, *European Geosciences Union General Assembly (virtual)*

Hakim, K., Bower, D. J., Tian, M., Deitrick, R., Auclair-Desrotour, P., Kitzmann, D., Dorn, C., Mezger, K., Heng, K. **(2020, contributed talk)**, The Role of Lithology in Silicate Weathering and CO_2 Regulation on Rocky Exoplanets, *Europlanet Science Congress (virtual)*

Hakim, K., Tian, M., Auclair-Desrotour, P., Deitrick, R., Bower, D. J., Kitzmann, D., Dorn, C., Mezger, K., Heng, K. **(2020, contributed talk)**, A Weathering Framework to Model the Inorganic Carbon Cycle on Rocky Exoplanets, *American Astronomical Society Meeting (virtual)*

Hakim, K. (2020, plenary talk), Geochemistry of Carbon Cycles on Rocky Exoplanets, *Exoplanets III Conference (virtual)*

Hakim, K. (2020, invited seminar), Application of Geosciences to Exoplanets, *Tata Institute of Fundamental Research, Mumbai, India*

Hakim, K. (2019, poster), Geochemistry of Carbon Cycles on Rocky Exoplanets, *Extreme Solar Systems 4, Reykyavik, Iceland*

Hakim, K., van den Berg, A., Vazan, A., Höning, D., van Westrenen, W., Dominik, C. **(2019, contributed talk)**, Thermal evolution of rocky exoplanets covered with graphite, *Division of Planetary Sciences – Europlanet Science Congress, Geneva, Switzerland*

Rivoldini, A., **Hakim, K.**, Van Hoolst, T., Cottenier, S., Jaeken, J., Chust, T., Steinle-Neumann, G. **(2018, poster)**, A New Ab Initio Equation of State of hcp-Fe and Its Implication on the Interior Structure and Mass-Radius Relations of Rocky Super-Earths, *European Geosciences Union General Assembly, Vienna, Austria*

Rivoldini, A., **Hakim, K.**, Van Hoolst, T., Cottenier, S., Jaeken, J., Chust, T., Steinle-Neumann, G. **(2017, poster)**, A New Ab Initio Equation of State of hcp-Fe and Its Implication on the Interior Structure and Mass-Radius Relations of Rocky Super-Earths, *American Geophysical Union Fall Meeting, Nans, USA*

Hakim, K. (2017, seminar), A laboratory approach to probe the mineralogy of carbon-enriched rocky exoplanets, *University of Chicago, USA*

Hakim, K., van Westrenen, W., Dominik, C. **(2017, contributed talk)**, Mineralogy of Carbon-Enriched Rocky Extra-Solar Planets from Laboratory Experiments, *Lunar and Planetary Science Conference, Houston, Texas*

Hakim, K., Rivoldini, A., Van Hoolst, T., Cottenier, S., Chust, T., Steinle-Neumann, G. **(2017, contributed talk)**, A New Ab Initio Equation of State of hcp-Iron and Its Application to the Interior Structure of Rocky Super-Earths, *Lunar and Planetary Science Conference, Houston, Texas*

Teaching Experience

2024 – present **Physics and Chemistry of Planets**, Co-Lecturer, *MSc Astro. & Astrophy.*, KU Leuven
2020 – 2021 **Radiative Transfer**, Teaching Assistant / Co-Lecturer, *MSc Physics*, University of Bern
2018 **Planetary Science**, Co-Lecturer, *MSc Earth Sciences*,VU Amsterdam
2015 – 2017 **Interstellar Medium**, Teaching Assistant, *MSc Astro. & Astrophy.*, University of Amsterdam

Supervision Experience

2024 – 2025 **Darshan Gove**, MSc Thesis, KU Leuven (Supervisor)
2024 – present **Soetkin Willemyns**, PhD Thesis, KU Leuven (Co-Supervisor)
2023 – present **Nuno Pereira**, PhD Thesis, KU Leuven (Co-Supervisor)
2023 – 2024 **Ine Malfait**, MSc Thesis, KU Leuven (Supervisor)
2021 – 2022 **Lukas Carmichael**, MSc Thesis, ETH Zürich (Co-Supervisor)
2018 **Dieke Bentjees**, BSc Thesis, VU Amsterdam (Co-Supervisor)
2016 **Rob Spaargaren**, BSc Thesis, VU Amsterdam (Co-Supervisor)

Service, Leadership and Professional Development

Reviewing Service for Funding Agencies

NASA ROSES
Université Paris Cité
Swiss National Science Foundation,

Reviewing Service for High-Impact Journals

Astrobiology
Journal of Geophysical Research
Astronomy & Astrophysics
Monthly Notices of Royal Astronomical Society
Planetary Science Journal
Geochimica et Cosmochimica Acta
Open Research Europe
Applied Geochemistry
Frontiers in Earth Science
Nature
Reviews of Modern Physics

Leadership Roles

2025 **Scientific Organising Committee (SOC)**, Belgian-Indian Network of Astronomy Meeting, Calicut, India
2023 **Session Convener**, Goldschmidt Conference, Lyon, France
2022 **Working Group Coordinator**, NCCR PlanetS Phase 3
2022 – 2023 **Session Convener**, European Geosciences Union General Assembly, Vienna, Austria
2019 – 2022 **Working Group Organiser**, Atmosphere-Interior Exchange, University of Bern
2016 – 2017 **PhD Representative**, PhD-PostDoc Council, University of Amsterdam, Netherlands
2015 – 2017 **Meeting Organiser**, Interdisciplinary PEPSci Network, Netherlands
2012 – 2014 **Student Representative**, Permanent Education Committee, KU Leuven

Selected Outreach and Education

2024 **Co-Lecturer**, Starquakes and Exoplanets in the Milky Way, Junior College STEM Course, KU Leuven
2023 **Podcast Guest**, Dark Matter Podcast on YouTube, Friends of Europe, Brussels
2021 **Outreach Contribution**, Planets in the Solar System, Astronomy Calendar
2019 **Public Science Talk**, Cooking Tiny Planets in the Lab, Astronomy on Tap Bern

2019 **Blog Writing**, The Role of Geosciences in Exoplanet Science, European Geosciences Union Blogs
2018 **Magazine Contribution**, A New Ultra-High-Pressure Equation Of State For Iron, Science Trends
2016 **Student Engagement Talk**, Carbon-rich exoplanets, Universidad de los Andes, Bogotá, Colombia
2015 **Volunteer**, Public Stargazing Nights, University of Amsterdam

Professional Memberships

2018 – present **Member**, International Astronomical Union
2019 – present **Member**, European Geosciences Union
2020 – present **Member**, European Association of Geochemistry