Kaustubh Hakim

Postdoctoral Researcher

University of Bern, Center for Space and Habitability, Gesellschaftsstrasse 6, 3012 Bern, Switzerland

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Education

University of Amsterdam *Amsterdam, Netherlands*

PhD, Astrophysics & Geochemistry (awarded on 18.12.2018) ***12.2018***

- Advisors: Prof. Dr. Carsten Dominik, Prof. Dr. Wim van Westrenen

KU Leuven *Leuven, Belgium*

MSc, Astronomy & Astrophysics ***07.2014***

- Advisor: Prof. Dr. Tim Van Hoolst

Indian Institute of Technology Kharagpur *Kharagpur, India*

BTech, Electronics Engineering ***07.2010***

- Advisor: Prof. Dr. Raja Datta

Employment

02.2019 – present	**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
07.2010 – 08.2012	**Intern**, IBM, Bangalore, India

Awards & Distinctions

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

Peer-reviewed

Bower, D. J., **Hakim, K.**, Sossi, P. A., Sanan, P. **(2021)**, Retention of water in terrestrial magma oceans and carbon-rich early atmospheres, *Planetary Science Journal, in review* [arXiv]

Narang, M., Oza, A. V., **Hakim, K.**, Puravankara, M., Banyal, R., Thorngren, D., Radio-Loud Exoplanet-Exomoon Survey (RLEES): GMRT Search for Cyclotron Maser Emission, *Astrophysical Journal, in review*

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]

In Prep

Hakim, K., Kitzmann, D., Kopparla, P., Heng, K., Impact of Positive Weathering Feedback on the Habitable Zone

Hakim, K., Tian, M., Bower, D. J., Heng, K., Carbonate Precipitation in Exoplanet Oceans: Key to Carbon Cycle Efficiency

Theses

Hakim, K. (2018), Diving Deep Into Rocky Exoplanets, *University of Amsterdam, Netherlands*

Hakim, K. (2014), The Interior Structure of Super-Earths, *KU Leuven, Belgium*

Hakim, K. (2010), Performance Evaluation of s-MAC protocol for Wireless Sensor Networks, *IIT, Kharagpur, India*

Selected Presentations

Hakim, K., Kitzmann, D., Kopparla, P., Heng, K. **(2021, poster)**, The impact of silicate weathering on exoplanet atmospheres and the habitable zone, *American Geophysical Union Fall Meeting (virtual)*

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

Hakim, K., Tian, M., Auclair-Desrotour, P., Deitrick, R., Bower, D. J., Kitzmann, D., Dorn, C., Mezger, K., Heng, K. **(2020, 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 III, *Exoplanets Conference (virtual)*

Hakim, K. (2020, 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, 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. **(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, New Orleans, 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, 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, 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

2020 – 2021	**Radiative Transfer**, Teaching Assistant / Co-Lecturer, *MSc Physics*
2018	**Planetary Science**, Co-Lecturer, *MSc Earth Sciences*
2015 – 2017	**Interstellar Medium**, Teaching Assistant, *MSc Astronomy & Astrophysics*

Supervision Experience

2021 – present **Lukas Carmichael**, MSc Thesis, ETH Zürich (Co-Advisor)
2020 – present **Mark Oosterloo**, PhD Thesis, University of Amsterdam (External Advisor)
2018 **Dieke Bentjees**, BSc Thesis, Vrije Universiteit Amsterdam (Co-Advisor)
2016 **Rob Spaargaren**, BSc Thesis, Vrije Universiteit Amsterdam (Co-Advisor)

Granted Telescope Time

Hakim, K., Oza, A. V. et al. **(2021)**, Radio-Loud Exoplanet-Exomoon Survey (RLEES): A Search for Tidally-Enhanced ECMI, *Giant Metrewave Radio Telescope, India*

Borsato, N., ..., **Hakim, K.** et al. **(2021)**, A reducing, hydrogen-dominated secondary atmosphere on a warm Earth-sized exoplanet? Constraining geochemistry with CRIRES, *European Southern Observatory, Chile*

Hoeijmakers, J., ..., **Hakim, K.** et al. **(2021)**, Searching for an atmosphere of 55 Cnc e and measuring the inclination of 55 Cnc b from L-band emission with CRIRES+, *European Southern Observatory, Chile*

Oza, A. V., **Hakim, K.** et al. **(2020)**, Novel Method to Detect Active Exomoons : Moon-Induced Cyclotron Emission, *Giant Metrewave Radio Telescope, India*

Hakim, K., Janssens, M. **(2013)**, To confirm three exoplanet candidates of different radii in the Kepler field of view and to determine their masses, *Mercator Telescope, La Palma, Spain*

Service, Leadership and Professional Development

Peer Review for High-Impact Journals

Journal of Geophysical Research, Astronomy & Astrophysics, Monthly Notices of Royal Astronomical Society, Planetary Science Journal

Leadership Roles

2022 – 2026 **Working Group Co-Animator**, NCCR PlanetS Phase 3
04.2022 **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

Development Courses

Lessons in leadership, University of Bern, How to keep your team motivated

Project Management for Researchers, NCCR PlanetS, How to drive collaborative projects successfully

Public Speaking for Scientists, University of Bern, Effectively connect your scientific content with the audience

Science Communication

Outreach Contribution, Planets in the Solar System, Astronomy Calendar (2021)
Public Science Talk, Cooking Tiny Planets in the Lab, Astronomy on Tap, Bern, Switzerland (2019)
Blog Writing, The Role of Geosciences in Exoplanet Science, European Geosciences Union Blogs (2019)
Magazine Contribution, A New Ultra-High-Pressure Equation Of State For Iron Gives Insight Into Super-Earth Interiors, Science Trends (2018)
Student Engagement Talk, Carbon-rich exoplanets, Universidad de los Andes, Bogotá, Colombia (2016)
Volunteer, Public Stargazing Nights, University of Amsterdam (2015–2017)

Professional Memberships

International Astronomical Union, European Geosciences Union, American Geophysical Union