Kaustubh Hakim

Personal Information

Male, November 22, 1988 — *Nationality:* Indian
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Education

University of Amsterdam, The Netherlands — Sep. 2014–present
Ph.D. *Astrophysics*
Supervisors: Prof. Carsten Dominik, *University of Amsterdam*
and Prof. Wim van Westrenen, *VU University Amsterdam*
Thesis: Formation, structure and evolution of rocky exoplanets
The aim is to study a full range of possible planetary compositions of the rocky exoplanets in terms of major elements. This will be achieved by implementing various possible compositions (including extreme cases) to the interior structure models based on thermodynamic modeling and high pressure experimentation at the high pressure lab in VU university. Such models will provide more realistic mass-radius relations, and constraints on surface and atmospheric composition which can further be compared with observations.

KU Leuven, Belgium — Sep. 2012–July 2014
M.Sc. (magna cum laude), *Astronomy and Astrophysics*
Supervisor: Prof. Tim Van Hoolst, *KU Leuven / Royal Observatory Brussels (ROB)*
Thesis: The interior structure of super-Earths
Extended a method for the analysis of the interior structure of terrestrial planets to the extra-solar planets with masses up to 10 earth masses called super-Earths. Included recently published high pressure material data and suitable equations of state. Studied the effects of composition and planet's size on the modeling. Predicted the interiors of observed super-Earths with the help of mass-radius relations.

Indian Institute of Technology Kharagpur, India — Aug. 2006–July 2010
B.Tech. (Honours), *Electronics and Electrical Communication Engineering*
Supervisor: Prof. Raja Datta, *IIT Kharagpur*
Thesis: Performance Evaluation of s-MAC protocol for Wireless Sensor Networks (WSN)
Improved s-MAC, a sensor network protocol for WSN, by introducing dynamic sleep and listen periods under variable network traffic load.

Research Experience

Nicolaus Copernicus Astronomical Center, Warsaw, Poland
Supervisor: Dr. Alexis Smith — July 2014–Aug. 2014
Summer Research Programme
Extended the data reduction pipeline of **Canada-France-Hawaii-Telescope** (CHFT) for **SuperWASP** exoplanets. Achieved complete generalisation of the pipeline with the help of Python, C-shell and IRAF. Successfully tested the pipeline on WASP-36b.

Mercator Telescope, Roques de las Mouchachos Observatory, La Palma, Spain
Supervisors: Prof. Hans van Winckel, Dr. Andrew Tkachenko — Oct. 2013–Dec. 2013
Observational Research School
Wrote a **proposal** to get observation time on HERMES spectrograph of the Mercator Telescope for the spectroscopic study of three **Kepler** mission targets in order to confirm the existence of exoplanet candidates around them. With the help of photometry and spectroscopy, **discovered** a (partially) eclipsing binary system. Others two targets turned out to be (most probably) false positives.

Belgian Institute for Space Aeronomy (BIRA), Brussels, Belgium
Supervisor: Dr. Johan de Keyser — Mar. 2013–June 2013
Academic project on the study of Earth's magnetopause
Applied empirical reconstruction technique to the observations of Earth's magnetopause made by Ampte/IRM and Cluster spacecrafts. Determined total **solar wind pressure** at the time of observations done by **Wind** and **ACE** and found its correlation with the magnetopause position.

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Industry Experience

Nomura, Mumbai, India — July 2010–Aug. 2012
Analyst
Assigned the ownership and maintenance of Risk Engine, a **trade monitoring** tool for Equities Division of Nomura-Global. Attended **business calls** with traders regularly to understand their business requirements and provided a user friendly interface with the help of Java, SQL and Shell scripting.

IBM, Bangalore, India — May 2009–July 2009
Trainee
Developed MisCompare Analysis Tool (MCAT) for the **hardware verification** of POWER/PowerPC FPU pseudo-random instruction streams using C and Shell scripting. Was offered a **Pre-Placement Offer** to join IBM after graduation.

Omega Electronics, Jaipur, India — May 2008–July 2008
Trainee
Drafted a new design for ETB-246, an educational training kit explaining the working of transformers. Did a live video demonstration describing the features of Radio frequency identification (RFID-1015) kit for the **Sales division**.

TATA Power, Mumbai, India — May 2007–June 2007
Trainee
Analyzed the calibration process of the transmitters used for pressure and temperature measurement in the two coal-based units of the 1580 Megawatt thermal power station.

Conferences

- **Hakim, K.;** van Westrenen, W.; Dominik, C., **High-pressure experiments to probe the interior of rocky exoplanets**, 2015, the 69th *Dutch Astronomy Conference*, Nunspeet, The Netherlands (20-22 May 2015).
- **Hakim, K.;** van Westrenen, W.; Dominik, C., **High-pressure experiments to probe the interior of carbide exoplanets**, 2015, *Exoplanets in Lund*, Lund, Sweden (6-8 May 2015).
- Van Hoolst, T.; Rivoldini, A.; **Hakim, K.;** Jaeken, J.; Cottenier, S., **High-pressure equations of state for iron and the interior structure of super-Earths**, 2014, *European Planetary Science Congress*, Cascais, Portugal (7-12 September 2014).
- **Hakim, K.;** Van Hoolst, T.; Rivoldini, A.; Cottenier, S., **The interior structure of super-Earths**, 2014, the 69th *Dutch Astronomy Conference*, Noordwijk, The Netherlands (19-21 May 2014).

Workshops

- 45th Saas-Fee course on **From Protoplanetary Disks to Planet Formation**, Swiss Society for Astrophysics and Astronomy (SSAA), Les Diablerets, Switzerland (15-20 March 2015).
- Nederlandse Onderzoekschool voor de Astronomie **(NOVA) Fall School in Astronomy**, Dwingeloo, The Netherlands (6-10 October 2014).

Relevant Skills

- Very good command over **English** language, reflected in the TOEFL score of 104/120.
- Sound quantitative and **analytical skills**, reflected in the GRE-Quant. score of 800/800.
- Excellent software programming skills with exposure to **Java, C, Python and Shell** scripting.
- Good knowledge of Server Query Language (**SQL**) to work on relational databases.
- Experience with Windows and UNIX based operating systems.
- Worked with software/tools like **Mathematica, PHOEBE,** FAMIAS and Period04.
- Knowledge of **hardware programming** languages: 8051/ARM Assembly Language and Verilog.
- Proficient with presentation tools like **LaTex**, MS PowerPoint and MS Word.