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Spinning worlds

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Citation

Schwarz, H. (2017, June 1). *Spinning worlds*. Retrieved from <https://hdl.handle.net/1887/49240>

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Title: Spinning worlds

Issue Date: 2017-06-01

Curriculum Vitae

I was born on June 11, 1986, in Hørsholm, Denmark. I was always fascinated by the night sky, but it was an astronomy course at Espergærde Gymnasium during my pre-university education that sparked the fire. Still, I was reluctant to choose astronomy as a career path. It was not before I experienced the night sky in its full, dark glory in the Australian outback that I realised that I had no choice but to follow my heart and study the Universe.

I enrolled in the Physics program at Copenhagen University in 2006 and obtained a Bachelor of Science degree in astronomy in 2010. My studies continued at Lund University where I completed a Master of Science degree in astrophysics in 2012. My master's thesis was about the photometric characterisation of a newly built Earthshine Telescope on Mauna Loa, Hawaii. The research project was a collaboration between the instrument department at Lund Observatory and the Danish Meteorological Institute (DMI), and I was supervised by Torben Andersen from Lund Observatory, and Peter Thejll and Hans Gleisner from DMI.

I accepted a PhD position at Leiden University, beginning September 2012, under the supervision of Prof.dr. Ignas Snellen. It was his work on characterising exoplanet atmospheres with high-dispersion spectroscopy which inspired me to aim for a career studying exoplanets. The original focus of my research was on hot Jupiter atmospheres, but gradually I shifted towards directly imaged planets, with a special interest in their formation and dynamical evolution. I developed a method for measuring the rotational velocity and the radial velocity of these planets and I set up a framework for how such measurements can be used to infer clues about the formation and early history of wide-orbit giant planets.

In 2016, I was awarded a Morrison Fellowship at the University of California Santa Cruz. I moved to California to begin my new Postdoc life in January 2017.

List of publications

Peer-reviewed publications

- *A framework to combine low- and high-resolution Spectroscopy for the Atmospheres of Transiting Exoplanets*
Brogi, M., Line, M., Bean, J., Desert, J.-M. & Schwarz, H.
ApJ, 839, L2 (2017)
- *Discovery of water at high spectral resolution in the atmosphere of 51 Peg b*
Birkby, J. L., de Kok, R. J., Brogi, M., Schwarz, H & Snellen, I. A. G.
AJ 153, 138 (2017)
- *The slow spin of the young sub-stellar companion GQ Lupi b and its orbital configuration*
Schwarz, H., Ginski, C., de Kok, R. J., Snellen, I. A. G., Brogi, M. & Birkby, J.L.
A&A 593, A74 (2016)
- *Rotation and winds of exoplanet HD 189733 b measured with high-dispersion transmission spectroscopy*
Brogi, M., de Kok, R. J., Albrecht, S., Snellen, I. A. G., Birkby, J. L. & Schwarz, H. ApJ 817, 106 (2016)
- *Evidence against a strong thermal inversion in HD 209458 b from high-dispersion spectroscopy*
Schwarz, H., Brogi, M., de Kok, R. J., Birkby, J. L. & Snellen, I. A. G.
A&A 576, A111 (2015)

- *Combining high-dispersion spectroscopy (HDS) with high contrast imaging (HCI): Probing rocky planets around our nearest neighbors*
Snellen, I. A. G., de Kok, R. J., Birkby, J. L., Brandl, B., Brogi, M., Keller, C., Kenworthy, M., **Schwarz, H.** & Stuik, R.
A&A 576, A59 (2015)
- *A search for TiO in the optical high-resolution transmission spectrum of HD 209458b: Hindrance due to inaccuracies in the line database*
Hoeijmakers, H. J., de Kok, R. J., Snellen, I. A. G., Brogi, M., Birkby, J. L. & **Schwarz, H.**
A&A 575, A20 (2015)
- *Fast spin of the young extrasolar planet beta Pictoris b*
Snellen, I. A. G., Brandl, B., de Kok, R. J., Brogi, M., Birkby, J. L. & **Schwarz, H.**
Nature 509, 63-65 (2014)
- *Carbon monoxide and water vapor in the atmosphere of the non-transiting exoplanet HD 179949 b*
Brogi, M., de Kok, R. J., Birkby, J. L., **Schwarz, H.** & Snellen, I. A. G.
A&A 565, A124 (2014)
- *Identifying new opportunities for exoplanet characterisation at high spectral resolution*
de Kok, R. J., Birkby, J. L., Brogi, M., **Schwarz, H.**, Albrecht, S., de Mooij, E. J. W. & Snellen, I. A. G.
A&A 561, A150 (2014)
- *The colour of the dark side of the Moon*
Thejll, P., Flynn, C., Gleisner, H., Andersen, T., Ulla, A., O-Petersen, M., Darudi, A. & **Schwarz, H.**
A&A 563, A38 (2014)
- *Detection of water absorption in the day side atmosphere of HD 189733 b using ground-based high-resolution spectroscopy at 3.2 micron*
Birkby, J. L., de Kok, R. J., Brogi, M., de Mooij, E. J. W., **Schwarz, H.**, Albrecht, S. & Snellen, I. A. G.
MNRAS 436, L35 (2013)

Conference proceedings

- *Molecules on the night-side of a non-transiting Hot Jupiter*
de Kok, R. J., Brogi, M., Birkby, J. L., **Schwarz, H.** & Snellen, I. A. G.
ESS 3, 111.16 (2015)
- *Measuring the spin of the directly imaged sub-stellar companion GQ Lupi b*
Schwarz, H., Brogi, M., de Kok, R. J., Birkby, J. L. & Snellen, I. A. G.
ESS 3, 104.14 (2015)
- *Detecting water at high spectral resolution in hot Jupiter atmospheres*
Birkby, J., Snellen, I., de Kok, R., Brogi, M., **Schwarz, H.**, Albrecht, S. &
de Mooij, E.
AAS 223, 230.04 (2014)
- *Exploring the atmosphere of HD 189733b at high spectral resolution*
de Kok, R., Birkby, J., Brogi, M., Snellen, I., Albrecht, S., de Mooij, E. &
Schwarz, H.
DPS 45, 105.02 (2013)
- *Probing hot Jupiter atmospheres with ground-based high-resolution spectroscopy*
Schwarz, H., Brogi, M., Birkby, J. L., de Kok, R. J., Snellen, I. A. G.,
de Mooij, E. J. W. & Albrecht, S.
EPSC 8, 44 (2013)
- *First results from new Earthshine telescope on Mauna Loa*
Thejll, P., Flynn, C., **Schwarz, H.**, Gleisner, H., Owner-Petersen, M., Darudi, A.
& Andersen, T.
EGUGA 14, 4975 (2012)

Other publications

- *Characterising exoplanet atmospheres with high-resolution spectroscopy*
Birkby, J., de Kok, R., Brogi, M., **Schwarz, H.**, Albrecht, S., de Mooij, E.
& Snellen, I.
Msngr 154, 57 (2013)

Acknowledgements

This thesis was made possible through the friendship, guidance and support from many different people, and not every deserving soul has made it onto this page. You have my thanks, all the same.

I am grateful to my uncle Regnar, who used to take me to the Tycho Brahe Planetarium when I was a child, and to Mogens Nørgaard Olesen, my inspiring high-school astronomy teacher. Both played a key role in helping me find my path.

During my years at the Sterrewacht, I was fortunate to be in a vibrant research group, and I have learned much from my PhD partners in crime, Matteo, Emanuele, Jens, Andrew, Geert-Jan & Sebastiaan: 'Thank you for the group meetings, the journal clubs and the things inbetween.' A special thank you goes to Jayne: 'You always went above and beyond, guiding me through the academic jungle'.

To the computer help desk: 'Only now that I am without you, do I fully appreciate your brilliance and speedy response times.' To Evelijn Gerstel: 'Your support in financial matters was of great value to me.' To Xander Tielens: 'Thank you for your guidance and words of wisdom.'

To the friends I met in Leiden: 'Every single one of you belong on this list, and I thank you for the fun times full of laughter, the lunch breaks, and the educational moments that occasionally crept in.' To my physics friends, Brian & Tom: 'Thanks for the shared beers and your willingness to always listen.' To my Danish astronomy-friends, Eva, Ann-Sofie & Eistrup: 'Thanks for being my Danish venting system - and for everything else.' To Leah: 'Thanks for the home-cooked meals and excellent company.' To Steven: 'Thanks for our many conversations and for translating the summary of this thesis to Dutch in record time'. To Jeroen, Marijke & Mason: 'Thanks for our amazing solar eclipse journey to the Faroe Islands.' To Ricardo: 'Thanks for the hug and the chocolates on a day when that was exactly what I needed.' To David: 'Thanks for so often understanding exactly how I felt.' — All of you kept me afloat.

Finally, to my family: 'Jeres kærlighed og støtte har bragt mig hertil, og jeg er jer evigt taknemmelig.'