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Cold gas in distant galaxies

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Cover Page



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Curriculum Vitae

Lein Adriaan Boogaard was born on January 5th, 1992 in Oegstgeest (The Netherlands). After graduating from the Gymnasium at the Visser 't Hooft Lyceum in Leiden in 2010, with a curriculum focused on science & technology, (classic) languages and music, he spent a year in Holsbybrunn (Sweden), completing the Torchbearers bible school in combination with an outdoor activity program. Returning to Leiden in 2011, he completed his bachelor's degree specifically in Astronomy (Sterrenkunde) at Leiden University in 2014, enjoying the opportunity to observe at the Isaac Newton Telescope in La Palma (Canary Islands). In 2016, he completed the 'research and astronomy' track of the Astronomy master's program in Leiden with honours (*cum laude*), with a specialisation in cosmology. Throughout the years, he has been actively involved in the education program, as a teaching assistant for bachelor's and master's courses, as teacher to dutch high school teachers in physics, and as student tutor.

The research-oriented education program in Leiden provided the opportunity to engage in several research projects, exploring different fields of astronomy (from small to large scales, both observational and theoretical). As part of his bachelor's thesis with Leon Trapman, he studied the gaps in transitional protoplanetary disks using first-cycle, high-frequency, submillimeter observations from the *Atacama Large Millimeter Array* (ALMA), under the supervision of dr. Michiel Hogerheijde. For the first master's thesis, he studied star formation in low-mass galaxies, under the supervision of dr. Jarle Brinchmann, using the first deep-field observations of *Multi Unit Spectroscopic Explorer* (MUSE) instrument on the *Very Large Telescope* (VLT), that had just been commissioned earlier that year, which also led to his involvement in the MUSE GTO team. He completed his master's with a second thesis in the group of prof. Joop Schaye, studying the escape of ionising radiation from simulated galaxies, under the supervision of dr. Joakim Rosdahl, who authored the simulation code (RAMSES-RT) that performed the radiation-hydrodynamics on an adaptive mesh.

In September 2016, he started his doctoral research under the supervision of prof. Paul van der Werf and dr. Rychard Bouwens, studying cold gas in distant galaxies. This work centred around the observations from the newly-awarded large program ASPECS, the ALMA Spectroscopic Survey of the *Hubble* Ultra Deep Field, in combination with spectroscopy from MUSE, KMOS and MOSFIRE, for which he spent time observing at the Very Large Telescope in Paranal (Chile) and at Keck on Hawai'i (USA). He has presented his work at international conferences and during public talks and outreach activities.

Starting March 2021, he will continue his research at the Max-Planck-Institut für Astronomie in Heidelberg (Germany), in the group of dr. Fabian Walter.

Acknowledgements

The completion of this thesis also marks an end of a decade at the Leiden Observatory, which I look back on with great pleasure and gratitude. In closing, I would like to thank a number of people who contributed to this thesis, directly or indirectly, fully aware that one cannot possibly hope to thank everyone who joined for part of the journey.

First and foremost, I would like to thank Paul van der Werf and Rychard Bouwens for their trust, encouragement, and enthusiasm throughout the years; closely involved when needed, while at the same time allowing me develop as an independent scientist and as a person. Being two very different people, I feel fortunate that I was given the opportunity to learn from both of you.

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I am deeply grateful to Jarle Brinchmann, for being a mentor and an example over the years, and for the way in which he guided me into the world of astronomical research, which played a key role in my decision to become an astronomer. I would also like to thank Joki Rosdahl, for his enthusiasm in supervising my master’s thesis and the decision to pursue a PhD. I am grateful to Michael Maseda for taking up the unofficial role of postdoc-mentor when I started my PhD and, together with Corentin Schreiber and Themiya Nanayakkara, for allowing me to share in their experience with optical and near-infrared spectroscopy. I also want to thank the (other) members of *Jarle’s Group*, including Mieke Paalvast, David Carton, Madusha Gunawardhana and Bas Zoutendijk, for the weekly discussions and for allowing me to stick around at them, even when my work was driving me toward the colder phases of the interstellar medium.

In later years, I greatly enjoyed meetings and discussions with Kirsty Butler, Matus Rybak, Hiddo Algra, Dieuwertje van der Vlucht, Marta Frias, Cristina Garcia, Sarah Leslie, Sander Schouws, and the other *Dust Mites* from the combined groups of Jacqueline Hodge, Serena

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alles wat edel is, alles wat rechtvaardig is,
alles wat zuiver is, alles wat lieflijk is, alles wat eervol is,
kortom, aan alles wat deugdzaam is en lof verdient.

Filippenzen 4: 8

