Floor van Donkelaar

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Department of Astrophysics
University of Zurich

Main research interests: The formation and evolution of galactic structures in Milky Way analogues at high redshift and their interactions with stellar clusters through (cosmological) simulations.

Personal Information

Nationality	Dutch
Date of Birth	July 1 1998
Languages	Dutch (Native), English (Fluent), German (Elementary), Swedish (Elementary)

Education

MSc in Astrophysics Aug 2019 - May 2021
Lund University, Sweden GPA: 3.83/4.00
Thesis: The fate of stars born in gas-rich high redshift galaxies
Supervisor: Prof. Dr. Oscar Agertz

BSc in sociotechnical engineering, minor in modern physics Sep 2016 - Jul 2019
University of Twente (ATLAS), The Netherlands GPA: 3.85/4.00
Thesis: The Star Formation Rate, Metallicity and Thermal Pressure in Galaxies at z=0.4 using MUSE
Supervisor: Dr. Kasper Borello Schmidt from Leibzin-Institut für Astrophysik Potsdam

Research Experience

University of Zurich
PhD student Sep 2021 – Present
Supervisor: Prof. Dr. Lucio Mayer
· Research on the formation of disc galaxies investigating the gasues halos with the high resolution cosmological simulation, PHOEBOS, to be used in combination with observations of SKA.
· Research on the formation of galaxy structures with GIGAERIS, a cosmological, N-body hydrodynamical zoom-in simulation of the formation of a Milky Way-sized galaxy.

Oxford University
Research Internship Jun 2020 – Nov 2020
Supervisor: Dr. Kearn Grisdale
Analyzing gas and stellar properties of Giant Molecular Clouds in Large Magellanic Cloud-size disc galaxy with the use of N-body hydrodynamical simulations.

Leibniz-Institut für Astrophysik Potsdam
Summer Project Jul 2017
Supervisor: Dr. Kasper Borello Schmidt
Generating template spectra of MUSE-Wide emission lines sources.

References

Prof. Dr. Lucio Mayer, University of Zurich, lucio.mayer@uzh.ch
Prof. Dr. Oscar Agertz, Lund University, oscar.agertz@astro.lu.se
Prof. Dr. Piero Madau, University of California & Università degli Studi di Milano-Bicocca, pmadau@ucsc.edu

Teaching & (Public) Outreach

Referee for MNRAS Oct 2024 - Present

Supervising Master student(s), University of Zurich Aug 2024 - Present
Supervisor for the semester thesis of ETH student Daniel Swingler, on the topic of star forming gas cloud properties at high redshift.

Teaching Assistant, University of Zurich

AST 201: Introduction to Astrobiology	Fall 2024
AST 245: Computational Astrophysics	Fall 2024
AST 202: The Universe: Contents, Origin, Evolution and Future	Spring 2024
AST 245: Computational Astrophysics	Fall 2023
AST 295: Astrobiology proseminar	Fall 2023
AST 248: The Sun and Planets	Spring 2023
AST 295: Astrobiology proseminar	Fall 2022
AST 202: The Universe: Contents, Origin, Evolution and Future	Spring 2022
AST 201: Introduction to Astrobiology	Fall 2021

Chief Public Relations, Green Team Twente Jun 2017 - Sep 2018
Student team working on one of the most efficient hydrogen city cars in world. As head of the public relations and graphic designer of the team, it was my main responsibility to decide about the appearance and organize the events of my team. Due to my work we won the Communication Award at the Shell Eco-Marathon of 2018.

Workshop developer, University of Twente May 2017 - Jun 2018
Supported and developed workshops about mentoring and the writing of personal development plans in the science track of the honours program at the University of Twente.

Selected Talks

A full list of the talks I have given can be found on my website.

- **'The GigaEris Simulation: What makes a high redshift (disc) galaxy different?'**
  Northwestern University, 26 Sep 2024
- **'The GigaEris Simulation: Stellar clusters in MW-sized galaxies at z>4'**
  CCA (New York), 13 Sep 2024
- **'First Results of the Phoebos Simulation: Galaxy Sizes during the Early Universe'**
  SKACH spring meeting (Winterthur), 11 Jun 2024
- **'The GigaEris Simulation: probing the evolution of disc galaxies evolution at Redshift $>$ 4'**
  IAP colloquium (Paris) 11 Dec 2023
- **'Stellar Systems at z $>$ 4: The hybrid formation scenario for the nuclear star cluster'**
  Lund University, 8 May 2023
- **'The Formation of the Nuclear Star Cluster'**
  University of Chicago, 28 Mar 2023
- **'Stellar Systems at z $>$ 4: Proto-Globular Cluster properties and the imposter amongst us'**
  Lund University, 16 Nov 2022
- **'Disc formation and Globular Cluster analogs in the high resolution GigaEris simulation'**
  ISSI (Bern), 31 Aug 2022
- **'On disc kinematics: The influence of the thin disc on star clusters'**
  Aspen Center for Physics, 18 Mar 2022

Publication overview

Number of (first-author) publications: 3 (3)
Number of (first-author) submissions: 3 (2)

List of Publications

1. *"In-situ formation of primordial star clusters at $z > 7$ via gaseous disc fragmentation; shedding light on the gems and on rapid black hole growth in the early Universe"*, Mayer L., van Donkelaar F., Messa, M., et al., 2024, arXiv:2411.00670

2. *"Exploring the fate of primordial discs in Milky Way-sized galaxies with the GigaEris simulation"*, van Donkelaar F., Mayer L., Capelo P. R., et al., 2024, arXiv:2406.11960

3. *"Wandering intermediate-mass black holes in Milky Way-sized galaxies in cosmological simulations: myth or reality?"*, van Donkelaar F., Mayer L., Capelo P. R., et al., 2024, arXiv:2404.15404

4. *"Stellar cluster formation in a Milky Way-sized galaxy at z>4 – II. A hybrid formation scenario for the nuclear star cluster and its connection to the nuclear stellar ring"*, van Donkelaar F., Mayer L., Capelo P. R., et al., 2024, MNRAS, 529, 4104

5. *"Stellar cluster formation in a Milky Way-sized galaxy at z>4 - I. The proto-globular cluster population and the imposter amongst us"*, van Donkelaar, F., Mayer, L., Capelo, P. R., et al. 2023, MNRAS, 522, 1726

6. *"From giant clumps to clouds - II. The emergence of thick disc kinematics from the conditions of star formation in high redshift gas rich galaxies"*, van Donkelaar, F., Agertz, O., & Renaud, F. 2022, MNRAS, 512, 3806

Skills

Programming Python | MATLAB | SQL | C | C++
Other LaTeX | Windows OS | Linux OS | Microsoft Office Package | Adobe Package

Active scientific member

Member of the HI Galaxy Science working group of **SKA** & part of **SKACH**