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TiborDome
tibordome

Tibor Dome

Curriculum Vitae

Educational History

University of Cambridge — **Cambridge, UK**
PhD in Astronomy: *Searching for Dark Matter Signatures in Large-Scale Structure Observables* — *10.2020 – 08.2024*
Supervisors: Anastasia Fialkov and Debora Šijački

Swiss Federal Institute of Technology in Zurich (ETH Zurich) — **Zurich, Switzerland**
Master of Science ETH in Physics — *09.2018 - 03.2020*

Purdue University — **West Lafayette, USA**
Student Exchange Programme — *01.2018 - 05.2018*

ETH Zurich — **Zurich, Switzerland**
Bachelor of Science ETH in Physics — *09.2015 - 02.2019*

Honors & Awards

College Senior Scholarship, Fitzwilliam College, 2023 — **Cambridge, UK**
G-Research PhD Grant, May 2023 — **Cambridge, UK**
DiRAC RAC 14th Call, 15.6 million CPU core-hours awarded, 2022/2023 — **Cambridge, UK**
DiRAC RAC 13th Call, 5.4 million CPU core-hours awarded, 2021/2022 — **Cambridge, UK**
Isaac Newton Trust, Maintenance Grant, 2020-2024 — **Cambridge, UK**

Key Skills

Programming Languages:	ROOT, C++, Python, bash, LaTeX
OS/Software:	Linux, Scikit-learn, HDF5, Pytorch, Paraview, Git, Intel MPI, OpenMP
Spoken Languages:	Hungarian (native), German (native), English (TOEFL: 109 points out of 120), French (DELF: B2), Spanish (B2)

Selected Publications

2023

- *Modeling Post-Reionization HI Distributions in FDM Cosmologies Using Conditional Normalizing Flows*
  - **Tibor Dome**, Rumail Azhar, Anastasia Fialkov
  - to be submitted to ApJ in October 2023
- *Quantum Carousel: The Fate of a Bound State Attached to a Linear Rotor*
  - **Tibor Dome**, Artem G. Volosniev, Areg Ghazaryan, Laleh Safari, Richard Schmidt, Mikhail Lemeshko
- *Mini-Quenching of High-Redshift Galaxies by Bursty Star Formation*
  - **Tibor Dome**, Sandro Tacchella, Anastasia Fialkov, Daniel Ceverino, Avishai Dekel, Omri Ginzburg, Sharon Lapiner, Tobias J. Looser

- *Cosmological Structure Formation and Soliton Phase Transition in Fuzzy Dark Matter with Axion Self-Interactions*
  - Philip Mocz, Anastasia Fialkov, Mark Vogelsberger, Michael Boylan-Kolchin, Pierre-Henri Chavanis, Mustafa A. Amin, Sownak Bose, **Tibor Dome**, Lars Hernquist, Lachlan Lancaster, Matthew Notis, Connor Painter, Victor H. Robles, Jesus Zavala
  - contributed to the interpretation of results and writing of the manuscript
- *Cosmic Web Dissection in Fuzzy Dark Matter Cosmologies*
  - **Tibor Dome**, Anastasia Fialkov, Nina Sartorio, Philip Mocz

2022

- *On the Cosmic Web Elongation in Fuzzy Dark Matter Cosmologies: Effects on Density Profiles, Shapes and Alignments of Halos*
  - **Tibor Dome**, Anastasia Fialkov, Philip Mocz, Björn Malte Schäfer, Michael Boylan-Kolchin, Mark Vogelsberger
- *CosmicProfiles: A Python package for radial profiling of finitely sampled dark matter halos and galaxies*
  - **Tibor Dome**
- *Resolving the π-assisted U-N σ_f-bond formation using quantum information theory*
  - Aleksandra Leszczyk, **Tibor Dome**, Paweł Tecmer, Dariusz Kedziera, Katharina Boguslawski
  - carried out many of the quantum chemical computations (as part of my summer internship) and contributed to the writing of the manuscript

Other Scientific Achievements

Condensed Matter Theory / Numerical Methods — **IST Austria, Austria**

Master's Project: *Interactions of a Rotating Impurity with a Bosonic Bath Beyond Linear Coupling* — *09.2019 - 03.2020*
IST Supervisor: Prof. Dr. Mikhail Lemeshko; ETH Supervisor: Prof. Dr. Manfred Sigrist

Random Matrix Theory / Numerical Methods — **IST Austria, Austria**

Science Internship: *The QR-algorithm with Random Data: Complexity and Tracy-Widom Universality* — *08.2018 – 09.2018*
Supervisor: Prof. Dr. László Erdős

Quantum Matter / Numerical Methods — **Nicolaus Copernicus University in Toruń (UMK), Poland**

Science Internship: *Resolving the π-assisted U-N σ_f-bond formation using quantum information theory* — *07.2018*
Supervisor: Prof. Dr. Katharina Boguslawski

Condensed Matter Theory / Numerical Methods — **ETH Zurich, Switzerland**

Seminars in Theoretical Physics — *02.2019 - 06.2019*
Lecturer / Organiser: Prof. Dr. Oded Zilberberg

- DMRG algorithm based on Matrix Product States
- The Schrieffer-Wolff Transformation

Statistical Mechanics: Exactly Solvable Models — **Purdue University, USA**

Semester Thesis: "The Periodic Zero-Field Six-Vertex Model - Sutherland's Free Energy" — *01.2018 - 05.2018*
Purdue Supervisor: Prof. Dr. Birgit Kaufmann; ETH Supervisor: Prof. Dr. Manfred Sigrist

Relevant Experience in Industry

Robotics / Satellite Navigation — **Septentrio, Belgium**

- ROS driver for Septentrio's cutting-edge GNSS and GNSS/INS receivers — *06.2020 – 10.2020*

Invited / Contributed Talks and Seminars Held

Mini-Quenching of Galaxies at High Redshift — **Konkoly Observatory, Hungary**
- *Summer Seminar* — *17.08.2023*

Bursty Star Formation and Mini-Quenching of Galaxies at High Redshift — **Cardiff, UK**
- NAM Talk (National Astronomy Meeting) — *04.07.2023*

Cosmic Web Studies in Fuzzy Dark Matter Cosmologies — **CERN, Switzerland**
- Third EuCAPT Annual Symposium — *31.05.2023*

Unveiling Halos and the Cosmic Web in Fuzzy Dark Matter Cosmologies — **Durham, UK**
- Friday Lunchtime Astronomy Talks (FLAT) — *15.04.2023*

Cosmic Web Studies in Fuzzy Dark Matter Cosmologies — **Cambridge, UK**
- CMB/LSS Discussion group — *02.02.2023*

Intrinsic Properties of Halos in Fuzzy Dark Matter Cosmologies — **Heidelberg, Germany**
- Seminar at Heidelberg ZAH — *13.09.2022*

Density Profiles, Shapes and Alignments of Halos in Fuzzy Dark Matter Cosmologies — **Mainz, Germany**
- 17th PATRAS workshop on axions, WIMPS and WISPS — *08.12.2022*

Baryonic Effects on Intrinsic Alignment — **Cambridge, UK**
- Kavli Focus Meeting, Contributed Talk — *17.05.2022*

Diving into ROSaic: GNSS driver for ROS — **Virtual**
- Webinar with Septentrio — *26.08.2021*

Bridging ROS and GNSS for robotics applications — **Virtual**
- Webinar with Open Robotics, Septentrio, NXP, amazon — *03.06.2021*

Identifying Cosmic Structures: NEXUS — **Virtual / Armagh Observatory, NI**
- STFC school — *12.01.2021 - 15.01.2021*

The Zero-Point Entropy of Square Ice — **ETH Zurich, Switzerland**
- Research Group Seminar — *16.11.2018*

The Zero-Point Entropy of Square Ice — **IST Austria, Austria**
- Mathematics Department Seminar — *06.09.2018*

AP1roG Modeling of Heavy-Element Compounds — **UMK, Poland**
- Physics Department Seminar — *27.07.2018*

Community Activities

Reviewer for MNRAS, 2023-present — **Cambridge, UK**
- Reviewed two papers in 2023 (as of 09/2023)

Relevant Teaching Experience

Mentoring of Summer Students — **Cambridge, UK**
- *Empowerment in Science (Oxbridge Academy Courses)* — *08.2023*

Part III Student Supervision **Cambridge, UK**

- Learning HI Distributions Using Normalising Flows *10.2022 - 05.2023*

Summer Student Supervision **Cambridge, UK**

- 21cm Temperature Maps of Fuzzy Dark Matter Cosmology *07.2022 - 08.2022*

Exam Preparation Tutor **Zurich, Switzerland**

- Physics II (2nd semester undergraduate course) *06.2019*

Didactic Training Course **Zurich, Switzerland**

- Didactics Training Certificate *04.2019*

Teaching Assistant **Zurich, Switzerland & Cambridge, UK**

- Physics II *02.2019 - 06.2019*
- Principles of Microeconomics *09.2018 - 01.2019*
- Principles of Quantum Mechanics *10.2020 - 03.2022*