

Dipl. Ing. Lukas Einramhof

PhD student - Institute of Science and Technology Austria

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Asteroseismology - Magnetism - White Dwarfs
Computational Fluid Mechanics - Gaussian Processes - Machine Learning

Education

PhD in Astrophysics, supervised by Assistant Prof. Lisa Bugnet, Institute of Science and Technology Austria - *Klosterneuburg, Austria*

(SEP 2024 - CURRENT)

Evolution and Detection of Internal Magnetic Fields in White Dwarfs

Courses: "Computational Data Analysis and Modeling for Stellar Physics", "Modern Observational Astrophysics"

Master in Technical Physics, Technical University of Vienna, Austria - *Dipl. Ing. (equivalent to MSc)*

(SEP 2020 - OCT 2022)

Graduated with distinction: average total grade = 1.3 (1=best, to 5=fail)

Thesis: Group equivariant neural networks for a scalar field theory

- *Code*: https://github.com/LukasEin/scalar_ml_reflection
- *Thesis*: 10.34726/hss.2022.97866
- *Technologies*: Python, Pytorch, Optuna

Topics: theoretical and mathematical physics, numerical computation, and machine learning

Additional Coursework - University of Vienna

Topics: mathematics of general relativity, dynamical systems, and probability

Bachelor in Technical Physics, Technical University of Vienna, Austria - *B.Sc.*

(AUG 2016 - AUG 2019)

Graduated with distinction: average total grade = 1.7 (1=best, to 5=fail)

Bachelor in Media Informatics, Technical University of Vienna, Austria - *B.Sc.*

(SEP 2015 - AUG 2016)

Switched degree program to Technical Physics

Voluntary Research Experience

Institute of Science and Technology Austria, Klosterneuburg, Austria - *Scientific Intern*

(DEC 2023 - SEP 2024)

- *Project*: Unveiling magnetic field topologies in the interior of red giant stars, accepted in Astronomy and Astrophysics
- *Methods*: Magnetohydrodynamics, Asteroseismology
- *Technologies*: MESA – stellar evolution code, GYRE – stellar oscillation code, Python

Institute of Science and Technology Austria, Klosterneuburg, Austria - *Scientific Intern*

(MAR 2023 - DEC 2023)

- *Project*: Building a machine learning framework for modeling the free energy of materials

- *Methods*: Gaussian Process Regression, Molecular Dynamics, Density Functional Theory
- *Technologies*: Python, Jax - Differentiable programming

Technical University of Vienna, Vienna, Austria - *Project Intern*
(JAN 2023 - FEB 2023)

- *Project*: A study of the DC optical conductivity in ferromagnetic SrCoO₃
- *Methods*: Density Functional Theory
- *Technologies*: Wien2K, Python

Undergraduate Education

Bachelor in Technical Physics, Technical University of Vienna, Austria - *B.Sc.*
(AUG 2016 - AUG 2019)

Graduated with distinction: average total grade = 1.7 (1=best, to 5=fail)

Bachelor in Media Informatics, Technical University of Vienna, Austria - *B.Sc.*
(SEP 2015 - AUG 2016)

Switched degree program to Technical Physics

Conferences

The BRITE side of Stars - *Unveiling complex magnetic field configurations in red giant stars* (Contributed talk)

(AUG 2024) University of Vienna, Vienna, Austria

Austrian Early Career Conference 2024 - Poster

(MAR 2024) Vega Observatory, Salzburg, Austria

CECAM Workshop - New Frontiers for Simulating Nonequilibrium Many-Body Systems in Physics and Chemistry: An Interdisciplinary Response - Poster

(JUN 2023) Sorbonne Université, Paris, France - Poster

Skills & Languages

Languages

German (mother tongue), English (C1)

Programming Languages

Python, C/C++, Fortran, MATLAB

Other

JAX - Differentiable Programming, Git, Pytorch, MESA, GYRE, LaTeX