

Eduard Keilmann

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Education

- 04/2021 - present PhD (Astrophysics) – I. Physikalisches Institut, University of Cologne**
- Title: *The Genesis of Stars: From Giant Molecular Clouds to Star-Forming Cores*
Research on the interstellar medium (ISM) and star-formation processes in the Milky Way and external galaxies, performing astrophysical data analysis, dust-dynamics and photodissociation-region (PDR) modeling, along with developing specialized analytical techniques, etc.
Investigate atomic and molecular cloud formation and stellar feedback's impact on the ISM using [CII] data from NASA SOFIA's FEEDBACK program.
Led student tutorial sessions, designing problem sets, and grading assignments and exams.
(Advisors: Prof. Dr. Jürgen Stutzki, Dr. Nicola Schneider)
- 2016 - 2019 Physics (Master of Science) – Johannes Gutenberg-Universität Mainz**
- Title: *Standard Model Effective Field Theory Effects in Dijet Events at Tevatron*
(Grade: 1,3)
Focus: Elementary Particle Physics, Quantum Field Theory
Minor: Meteorology (Atmospheric Hydrodynamics)
Parts of the results of my master thesis are published at the renowned peer-review journal JHEP:
[https://doi.org/10.1007/JHEP09\(2019\)086](https://doi.org/10.1007/JHEP09(2019)086)
- 2011 - 2016 Physics (Bachelor of Science) – Johannes Gutenberg-Universität Mainz**
- Title: *Massenbestimmung steriler Neutrinos anhand von Supernovae*
Minors: Mathematics und Informatics
- 2010 - 2011 Fachgebundene Hochschulreife (High School Diploma) – Berufsbildende Schule 1 Mainz**

Employment

- 04/2021 - present Doctoral Researcher (Wissenschaftlicher Mitarbeiter) – I. Physikalisches Institut, University of Cologne**
Research on the interstellar medium (ISM) and star-formation processes in the Milky Way and external galaxies, performing astrophysical data analysis, dust-dynamics and photodissociation-region (PDR) modeling, and developing specialized analytical techniques, etc.
Investigate atomic and molecular cloud formation and stellar feedback's impact on the ISM using [CII] data from NASA SOFIA's FEEDBACK program.
Led student tutorial sessions, designing problem sets, and grading assignments and exams.
- 10/2019 - 03/2021 Aktuar (Mathematiker) – HDI, Cologne**
Developed and implemented the internal "Leben" mathematical model for Solvency II – compliant risk modeling of life insurance portfolios.
- 06/2019 - 09/2019 Software Developer – Hottgenroth, Cologne**
Developed software for building simulations focused on the physical parameters critical to energy-efficient buildings, particularly climate data.
- 06/2017 - 12/2018 Software Development/-architecture (Werkstudent) – BioNTech, Mainz**
Engineered software solutions and defined software architecture, overseeing project planning, documentation, and evaluating applications (with contact to U.S. teams).
Gained foundational project coordination experience by managing a focused software development initiative.
- 09/2014 - 12/2015 Research Assistant – Institut für Physik, Mainz**
Built acousto-optic modulator (AOM) driver systems for laser-based quantum physics experiments.
- 06/2014 - 09/2014 Research Assistant – Institut für Kernphysik, Mainz**
IT-Administration for the Institute of Nuclear Physics.

- 08/2009 - 12/2009 **License Management – T-Systems, Darmstadt**
Managed software licensing for mainframe computer systems.
- 09/2006 - 06/2009 **Apprenticeship IT-Specialist (Berufsausbildung zum Fachinformatiker) – Deutsche Telekom, Mainz**
Designed and developed software applications in C++.

Publications

[NASA ADS Link](#)

Science/Research Presentations

- 09/2023 **German Astronomical Society – Berlin (contributed talk)**
FEEDBACK observations of RCW79
- 04/2024 **Heritage of SOFIA – Scientific Highlights and Future Perspectives, NASA/SOFIA Conference – Stuttgart (poster presentation)**
First Detection of the [CII] 158 μm Line in the Intermediate Velocity Cloud Draco
- 07/2024 **Research Group Prof. Walch-Gassner (seminar talk) – University of Cologne (invited talk)**
M33 Molecular Cloud Matching
- 09/2024 **German Astronomical Society – Cologne (contributed talk)**
M33 Molecular Cloud Matching
- 01/2025 **Science with the Atacama Pathfinder Experiment (APEX), Max-Planck Conference – Ringberg (poster presentation)**
Unveiling Star Formation in the Milky Way: *SOFIA's legacy in Cygnus X*

05/2025

Star Formation, Stellar Feedback, and the Ecology of Galaxies Conference – Visegrad, Hungary (poster presentation)

Reassessing the [CII]-Deficit in RCW79

Observing Proposals

Successful as PI

2022

APEX (18.6h)

[CI] Observations in the M33 Southern Arm

Project Code: #109.23FN

2024

APEX (17.7h)

An evolutionary tale of three interstellar bubbles

Project Code: #M9502A_113

Successful as Co-PI

2024

IRAM, 30m (25.4h)

The Diamond Ring in Cygnus X: Composition and Evolution of an unusual ring in [CII]

Project Code: #P458622

PI: Simon Dannhauer

2025

IRAM, 30m (5.4h)

Molecular gas dynamic and conditions in a proplyd-like object in Cygnus X

Project Code: #P487526

PI: Dr. Nicola Schneider

2025

IRAM, NOEMA (12h)

Outflows and shocks in a proplyd in Cygnus

Project Code: #P484678

PI: Simon Dannhauer

Associated Research Collaborations

SFB956

Conditions and Impact of Star Formation

SFB1601

Habitats of massive stars across cosmic time

FEEDBACK

NASA FEEDBACK SOFIA Legacy

Other

Strong abstract and analytical thinking with a problem-solving orientation, expertise in data science, strategic planning, and machine learning. Proficient in Python, C++, Mathematica, R (statistics), GILDAS, and ROOT (CERN).