

Joana Anna Kramer

Curriculum Vitae

Current Position

since 06/2020 – **Doctoral researcher**, *Max Planck Institute for Radioastronomy, Bonn*,
06/2023 (est.) PhD thesis title: “Magnetohydrodynamic Processes and Polarized Emission in AGN Jets”,
Supervisors: Prof. Dr. Anton Zensus & Prof. Dr. Andreas Eckart.
Advisors: Prof. Dr. Eduardo Ros & Dr. Nicholas R. MacDonald.

Education

10/2017 – 05/2020 **Master of Science in Astrophysics**, *Rheinische Friedrich-Wilhelms-University of Bonn, Master program at the Bonn-Cologne Graduate School of Physics and Astronomy*,
Thesis title: “Extragalactic Jets - Relativistic Magnetohydrodynamic Simulations and Ray-Tracing”,
Supervisors: Prof. Dr. Anton Zensus & Prof. Dr. Norbert Langer.

10/2013 – 09/2017 **Bachelor of Science in Physics**, *Rheinische Friedrich-Wilhelms-University of Bonn*,
Thesis title: “Very Long Baseline Array Imaging of a TANAMI Active Galactic Nucleus”,
Supervisors: Prof. Dr. Eduardo Ros & Prof. Dr. Thomas Reiprich.

05/2013 **Abitur**, *Gymnasium im Gustav-Heinemann-Schulzentrum*, Dinslaken, Germany,
Focus subjects: Physics, Mathematics, Philosophy, English.

Scholarships and Awards

09/2021 **Recipient of the JoVE Researcher Innovation Award.**

since 06/2020 **International Max Planck Research School for Astronomy and Astrophysics, IMPRS.**

since 10/2017 **Bonn-Cologne Graduate School for Physics and Astronomy, BCGS.**

Publications

First-Author ***Hybrid-Fluid Particle Jet Simulations: A Polarimetric Study**, *J. A. Kramer, N. R. MacDonald, A. Mignone, B. Vaidya*, 2023 (est.), Manuscript in preparation.

***Probing Circular Polarization and Magnetic Field Structure in AGN Cores**, *J. A. Kramer, E. Ros, D. Pesce, I. Myserlis, S. Jorstadt, A. Marscher, N. MacDonald*, 2023 (est.), Manuscript in preparation.

***Ray-Tracing in Relativistic Magnetohydrodynamic Jet Simulations: A Polarimetric Study**, *J. A. Kramer & N. R. MacDonald*, EVN Online, 2022, Conference Proceedings.

Ray-Tracing in Relativistic Jet Simulations: A Polarimetric Study of Magnetic Field Morphology and Electron Scaling Relations, *J. A. Kramer & N. R. MacDonald*, *A&A*, 2021, Refereed publication.

Co-Author **Probing plasma composition with the next generation Event Horizon Telescope (ngEHT)**, *R. Emami, ..., J. A. Kramer*, submitted to *Galaxies*, arXiv:2211.07306.

Quasi-simultaneous, full-Stokes millimeter radio observations of the blazar PKS 1741-03 with the IRAM 30m Telescope in the proximity of the neutrino event IceCube-220205B, *I. Myserlis, I. Agudo, C. Casadio, C. Thum, T. Traianou, J. Escudero, J. A. Kramer* on behalf of the POLAMI collaboration, *Astronomer's Telegram (ATel)* 2022.

Observations

Observing Grants

2022 **Global mm-VLBI Array (GMVA)**, *M2FINDERS: extreme magnetic fields in the vicinity of super-massive black holes*, 42 hours, PI: A.-K. Baczkó.

2022 **Global mm-VLBI Array (GMVA) + ALMA + Event Horizon Telescope (EHT)**, *A detailed study of the sub-pc jet of BL Lacertae at mm-wavelengths*, 13 hours, PI: D. Kim.

2022 **Very Long Baseline Array (VLBA)**, *M2FINDERS: extreme magnetic fields in the vicinity of super-massive black holes*, 42 hours, PI: M. Lisakov.

2021 **Very Long Baseline Array (VLBA)**, *Probing Circular Polarization and Magnetic Field Structure in AGN Cores*, 24 hours, PI: J. A. Kramer.

2021 **Event Horizon Telescope (EHT) + ALMA**, *Revealing the magnetic field in the jet acceleration zone of the Crazy Diamond*, 8 hours, PI: T. Traianou.

Support Observer

2022 **Observing support for GMVA observation at IRAM**, *30 m radio telescope*, Pico Veleta, Spain.

since 06/2021 **Observing support for the POLAMI collaboration at IRAM**, *30 m radio telescope*, Pico Veleta, Spain.

2020/2021 **Observing support for GMVA observation in Effelsberg**, *100 m radio telescope*, Effelsberg, Germany.

Professional Experience

1. Scientific Stay

11/2022 **Center for Astrophysics (CfA), Harvard University**, *Black Hole Initiative*, Prof. Dr. Shep Doeleman, Prof. Dr. Michael Johnson, Dr. Dominic Pesce. Stokes V Calibration of VLBA data

2. Workshops

05/2022 **NRAO Synthesis Imaging Workshop**, *Online*.

05/2022 **Polarization in VLBI: tools for advanced calibration and analysis**, *Max Planck Institute for Radio Astronomy*, Ivan Marti-Vidal.

04/2022 **Principles and tools of statistics, data analysis and machine learning: I. Statistics**, *Max Planck Institute for Radio Astronomy*, Gunther Witzel.

- 03/2022 **IMPRS Professional Skills Training: Scientific Writing**, *Max Planck Institute for Radio Astronomy*, Justin Mullin and Mark Buchanan.
- 10/2019 **Zeitmanagement - Strategien für ein gutes Selbstmanagement**, *Time management - strategies for a successful management*, Max Planck Institute for Radio Astronomy, Techniker Krankenkasse.

3. Teaching experience

- 06/2020 – 04/2022 **Research Assistant at the Physikalisches Institut (PI)**, *Rheinische Friedrich-Wilhelms-University of Bonn (Bonn, Germany)*.
- 10/2017 – 04/2019 **Research Assistant at the Physikalisches Institut (PI)**, *Rheinische Friedrich-Wilhelms-University of Bonn (Bonn, Germany)*.
- 04/2016 – 10/2017 **Student Assistant at the Physikalisches Institut (PI)**, *Rheinische Friedrich-Wilhelms-University of Bonn (Bonn, Germany)*.

4. Organizational skills

- 2022 **International Max Planck Research School (IMPRS) Retreat**, *Max Planck Institute for Radio Astronomy*, Cochem, Germany.
- 03/2022 **International Max Planck Research School (IMPRS) Conference**, *Max Planck Institute for Radio Astronomy*, Online.
- 04/2017 **Girlsday 2017**, *Collaboration with the Max-Planck-Institute for Radioastronomy*, Bonn, Germany.

5. Communicative skills

- 11/2022 **Invited Talk**, *ngEHT/EHT Group Meeting at the Black Hole Initiative (BHI)*, Harvard University, Cambridge, Massachusetts, USA, Ray-Tracing in Relativistic Jet Simulations: Circular Polarization.
- 10/2022 **Invited Talk**, *Science Enabled with Multi-Band Receivers and Frequency Phase Transfer*, Bonn, Germany, Numerical Simulations and Interpretation.
- 07/2022 **Contributed Talk**, *15th European VLBI Network Symposium & Users Meeting*, Cork, Ireland, Ray-Tracing in Relativistic Jet Simulations: Circular Polarization.
- 06/2022 **Poster**, *European Astronomical Society Meeting*, Valencia, Spain, Ray-Tracing in Hybrid Magnetohydrodynamic Jet Simulations: A Polarimetric Study.
- 06/2022 **Contributed Talk**, *Event Horizon Collaboration Meeting*, Granada, Spain, Ray-Tracing in Relativistic Jet Simulations.
- 10/2021 **Invited Talk**, *JoVE Researcher Innovation Webinar Series, Virtually*, Establishing RadioViews as a digital platform.
- 08/2021 **Contributed Talk**, *Young European Radioastronomers' Conference (YERAC), Virtually*, Ray-Tracing in Relativistic Magnetohydrodynamic Jet Simulations.
- 07/2021 **Contributed Talk**, *European VLBI Network Symposium (EVN), Virtually*, Ray-Tracing in Relativistic Magnetohydrodynamic Jet Simulations.
- 06/2021 **Poster**, *Extragalactic jets on all scales - launching, propagation, termination, Virtually*, Ray-Tracing in Relativistic Magnetohydrodynamic Jet Simulations.
- 01/2021 **Poster**, *COSPAR 2021 Scientific Assembly, Virtually*, Ray-Tracing in Relativistic Magnetohydrodynamic Jet Simulations.
- 09/2019 **Poster**, *The 3C Extragalactic Radio Sky: Legacy of the Third Cambridge Catalogue, Turin, Italy*, Ray-Tracing Through RMHD Jet Simulations.

06/2019 **Contributed Talk**, *Bonn-Dwingeloo Neighbourhood VLBI Meeting 2019*, Ray-tracing through RMHD Jet Simulations: Using Polarized Radiative Transfer to Disentangle the Magnetic Field Structure of Relativistic Outflow.

Professional Memberships

- since 11/2021 **Event Horizon Telescope Collaboration (EHTC)**, *Polarimetry Working Group (WG), Non-horizon Science/AGN WG, and Theory and Simulation WG.*
- since 11/2021 **M2Finders Team**, *Mapping Magnetic Fields with INterferometry Down to Event hoRizon Scales*, ERC Advanced Grant, PI: Prof. Dr. J. A. Zensus.
- since 09/2021 **European Astronomical Society (EAS).**
- since 09/2021 **German Astronomical Society (AG).**
- since 06/2021 **Polarimetric Monitoring of AGN at mm-Wavelengths (POLAMI) Program.**

Outreach

- 05/2022 **Event Horizon Telescope (EHT) Campaign**, *Press conference at European Southern Observatory (ESO), Garching, Germany*, Coordinating interviews, schedules, and rehearsals.
- since 01/2021 **RadioViews**, *Youtube Channel*, Coordinating, filming, and editing interviews with research members of the VLBI Group of the MPIfR.

Languages

German (Native)
English (Fluent)
Latin (Basic)

Computer Skills

OS Linux, Mac (excellent)
Programming C, Python (good)
Markuplanguages \LaTeX (excellent)
Software PLUTO, RADMC-3D (good)
MESA, AIPS, DIFMAP, CASA, ParaView (basic)
Office, Keynote (excellent)

Interests

Voluntary work at the Albert-Schweizer animal shelter Bonn
Foodsaver at Foodsharing e.V., Bonn
Philosophy
Singing (Soprano in different ensembles)
Classical standard and latin dancing
Skiing