Jelena Köhler (she/her)

Doctoral Researcher

Work Experience



LMU

Doctoral Researcher

Institution: Karlsruhe Institute of Technology since July 2022

Collaborations: Pierre Auger Collaboration, GRAND

Research Topic: Development of a Second-Level Trigger for the Autonomous Detection of Air-Shower Radio Emission

Education

Master of Science, Physics Institution: University of Wuppertal Year of Graduation: 2022

Master Thesis: Optimization of Radio Reconstruction for Inclined Air Showers with AERA at the Pierre Auger Observatory

Bachelor of Science, Physics Institution: University of Wuppertal Year of Graduation: 2020

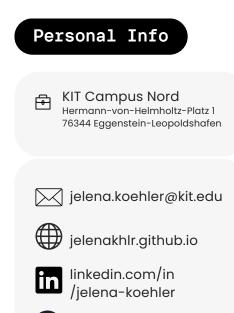
Bachelor Thesis: The Size-Mass Distribution of Galaxies and the Merging History of Massive Galaxies Institution: Ludwig-Maximilians-Universität München

Outreach

Science Communicator Netzwerk Teilchenwelt since August 2023

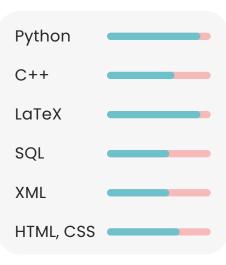
Other

PhD Fellow Representative KSETA since March 2023





Relevant Skills



Languages



Scientific Background Jelena Köhler Karlsruhe Institute of Technology

My research focuses on novel radio techniques for cosmic ray air showers. This rapidly growing field allows cost-effective deployment of large detector arrays like GRAND. However, current radio trigger systems, relying solely on timing information, struggle with background noise.

To address this, I'm developing a novel event-level trigger for GRAND that analyzes the radio footprint – the spatial distribution of signal strength across triggered antennas. This approach offers a more comprehensive picture of the event, improving background rejection and sensitivity.

My work explores multiple techniques to analyze the footprint, including deriving formulas, using plane wave fits, and leveraging machine learning. This research presents the first comprehensive exploration of the radio footprint for event-level triggering, with the potential to significantly enhance GRAND's capabilities. I'm actively developing and testing these methods with simulated data, aiming for future implementation on real GRAND data. This work paves the way for improved event selection in next-generation cosmic ray experiments by unlocking the power of the radio footprint.