Contribution ID: **11** Type: **Talk**

Generative Neural Networks for Simulating Radio Emission from Air Showers (Remote)

Wednesday, 29 January 2025 11:00 (20 minutes)

The simulations of radio emission from EAS are essential for reconstructing various shower parameters from the measured radio signals. As bigger experiments use more and more antennas, the computational cost of these simulations gets prohibitively large. These simulations also scale exponentially with higher primary energies and linearly with the number of antennas. Thus there is a need to interpolate and generate radio signals across various energy ranges and antenna positions.

In this work, we present a novel neural network which can predict radio pulses for the AERA setup using several shower parameters and antenna positions as input. The results which showcase the pulses generated by the network compared to the CoREAS simulations, are presented. The network's ability to also get the fluence pattern and the total radiation energy is shown along with its performance benchmarks. Finally, the network is used in a simplistic Xmax reconstruction procedure to show the viability of these generated pulses for Xmax reconstruction.

Type of Contribution

talk

Primary authors: SAMPATHKUMAR, Pranav (IAP, KIT); HUEGE, Tim (Karlsruhe Institute of Technology)

Presenter: SAMPATHKUMAR, Pranav (IAP, KIT)

Session Classification: Talks