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Reconstruction of air-shower measurements with AERA in the presence of pulsed radio-frequency interference

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The Auger Engineering Radio Array (AERA) is situated in the Argentinian Pampa Amarilla, a location far away from large human settlements. Nevertheless, a strong background of pulsed radio-frequency interference exists on site, which not only makes radio self-triggering challenging, but also poses a problem for an efficient and pure reconstruction of air-shower measurements.

We present how our standard event reconstruction exploits several strategies to identify and suppress pulsed noise. We make consequent use of the event geometry as determined with the Auger surface detector to reliably identify cosmic-ray radio pulses. Polarization information, pulse-shape information, the contiguity of the spatial distribution of antennas with a detected pulse, and the consistency of the arrival times of the measured radio pulses provide further ways to discriminate RFI pulses from cosmic-ray pulses.

We discuss our algorithms and quantify their efficiency and purity. These strategies can be employed by any experiment taking data in the presence of pulsed RFI.

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