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Lightning Detection at the Pierre Auger Observatory

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As part of the Auger Engineering Radio Array, an extension of the Pierre Auger Observatory with antennas in the MHz range, it is necessary to monitor the local atmospheric conditions. These have a large influence on the radio emission induced by air showers. In particular, amplified signals up to an order of magnitude have been detected as an effect of thunderstorms. For a more detailed investigation and the detection of thunderstorms, a new lightning detection system has been installed at the Pierre Auger Observatory in Argentina. In addition, an electric field mill measures the electric field strength at ground level at the antenna array. With these measurements, data periods can be classified for their influence by thunderstorms. Additionally, a lightning-based trigger for the water-Cherenkov detectors was developed to read individual stations when lightning strikes nearby. With these data a possible correlation between the formation of lightning and cosmic ray showers can be investigated even at low energies of about 10^{15} eV. In this talk the structure and functionality of the lightning detection system are described, and first data analyses are shown.

Collaboration

Pierre Auger

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