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Hybrid Performance of the Pierre Auger Observatory MIGUEL MOSTAFA, University of New Mexico, PIERRE AUGER COLLABORATION —
The Pierre Auger Observatory detects ultra-high energy cosmic rays combining two complementary air shower techniques. The designed observation in coincidence of particles at ground and the associated fluorescence light generated in the atmosphere is achieved with a large array of water Cherenkov detectors coupled with air fluorescence detector sites. The combination of fluorescence and ground array measurements provides reconstruction of the shower axis geometry with unprecedented accuracy, which in turn yields improvements in measurements of all other observables. Timing information from even a single surface detector can much improve the geometric reconstruction, thus lowering the energy threshold for hybrid events to well below the surface detector design threshold of 10 EeV. In these hybrid events, the simultaneous independent measurements of longitudinal and transverse shower observables via the two techniques give powerful crosschecks on the data analysis and better control over systematic uncertainties in the energy measurement. In this paper the hybrid reconstruction approach and its performance are described.

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