Expected performance of the AugerPrime Radio Detector

Executive Summary PoS (ICRC21) 262

What is this contribution about?

Monte-Carlo driven, end-to-end simulation study of the performance / potential of the AugerPrime Radio Detector (RD).

Why is it relevant/interesting?

RD will allow mass-sensitive measurements of inclined air showers with AugerPrime, complementing the Auger particle detector and thus providing muon-electron separation, hence increasing sky-coverage for mass-sensitive measurements.

What has been done?

A complete end-to-end detector simulation, including the addition of measured noise, and a fully realistic radio-based shower reconstruction.

What is the result?

RD will detect over 4000 inclined air showers with energies above 10^{19} eV in 10 years with an energy resolution below 10%, increasing the available statistics by more than one order of magnitude w.r.t. Auger Fluorescence Detector (FD). Measurements of the muon fluctuations will allow us to determine the mass composition of cosmic rays at the highest energies.

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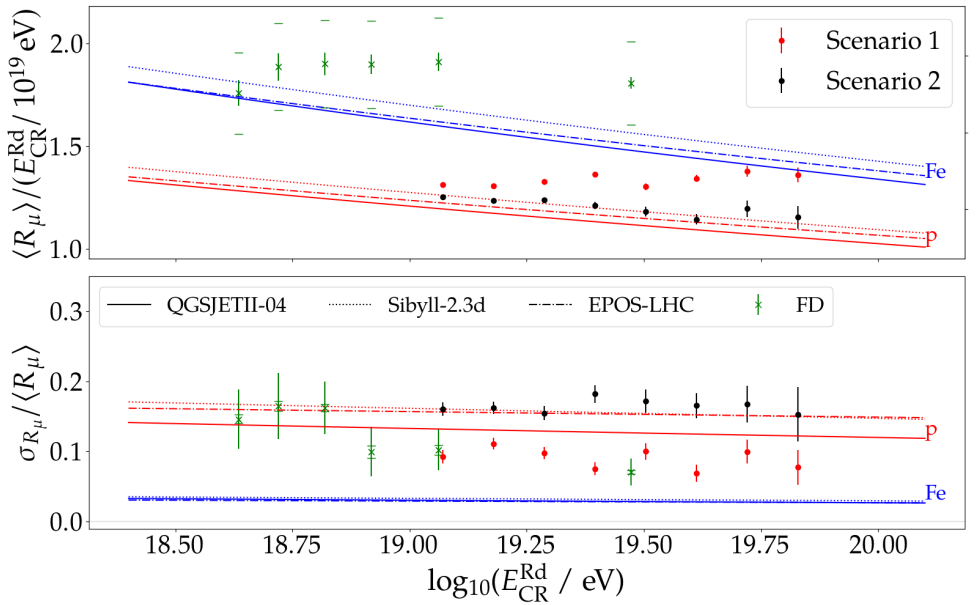

Figure 1: Simulated measurement of the relative mean number of muons with the RD for a maximum-rigidity (1) and photo-disintegration (2) composition scenario, shown alongside the most recent measurements by FD.