Performance of the 433 m surface array of the Pierre Auger Observatory

Executive Summary

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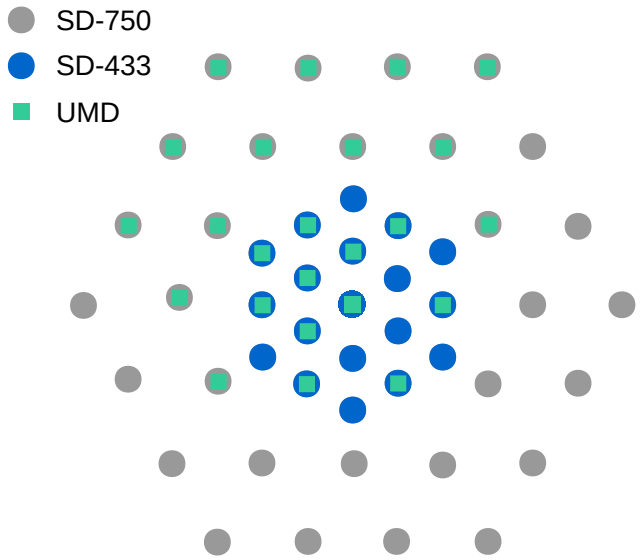
We present an array of 19 water-Cherenkov detectors spaced at 433-m that has been added to the Pierre Auger Observatory. The new array complements the existing 750-m and 1500-m ones by reaching energies down to 10 PeV thus giving Auger the capability to observe with a surface detector the second knee of the cosmic-ray spectrum, and search for ultra-high energy photons coming from the Galactic Center.



We present the first results of the 433-m array after seven years of data taking and an evaluation of its performance from simulations. We found from data the lateral distribution function, an optimal distance of 300 m to measure the energy, and the angular resolution as function of the energy. From simulations we determined that the array is fully efficient above 50 PeV for cosmic-rays arriving at less than 45° of zenith angle.