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AugerPrime: the Upgrade of the Pierre Auger Observatory

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The Pierre Auger Observatory is the largest facility for the study of ultra-high energy cosmic rays (UHECRs). After nearly 20 years of successful operation, the observatory has provided many new insights about the spectrum, anisotropies and composition of UHECRs. However, more precise measurements are needed to obtain a complete picture about the nature and origin of these particles, to understand the cause of the observed flux suppression at the highest energies, to solve the puzzle of the missing muons in models of air showers, and to assess the existence of ultra-high energy neutrinos and photons.

To tackle these questions, the installation of an upgrade of the Auger Observatory, called AugerPrime, is underway. It consists in scintillation detectors and radio antennae placed above the water Cherenkov surface detectors, the addition of a small PMT, and the replacement of the surface detector electronics. In addition, in a more densely filled subset of the array, underground muon detectors will provide a direct determination of the number of muons in air showers produced by UHECRs.

We will give an overview of the AugerPrime upgrade, its scientific motivations, the status of its installation and commissioning, and the performance of the new systems, based on first data already available.

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