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Recent Results from the Pierre Auger Observatory and its upgrade AugerPrime

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The Pierre Auger Observatory is conceived to study ultra-high energy cosmic rays from about 10ˆ17 eV to beyond 10ˆ20 eV. It is a multi-hybrid Observatory comprising 1660 surface detector stations spread over an area of 3000 km2 over-looked by 27 imaging Fluorescence telescopes erected at four sites at its periphery. Each of the detector stations consists of a 10 m2 water Cherenkov detector which is covered by a 3.8 m2 plastic scintillator and with a dual-polarized radio antenna (30-80 MHz) placed at the top.
The first phase of data-taking began in 2004 and continued until the end of 2021. In this contribution, results from the Phase I data analysis of the Pierre Auger Observatory are presented. They include, among others, measurements of the cosmic-ray energy spectrum, composition, arrival directions, and multi-messenger studies involving searches for UHE photons and neutrinos. The plethora of results have provided many surprises that have significantly advanced the understanding of the Universe at the highest energies and it has also laid the foundation for second-phase studies with the upgraded AugerPrime detector. The status of the AugerPrime upgrade and its performance will be also discussed.

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