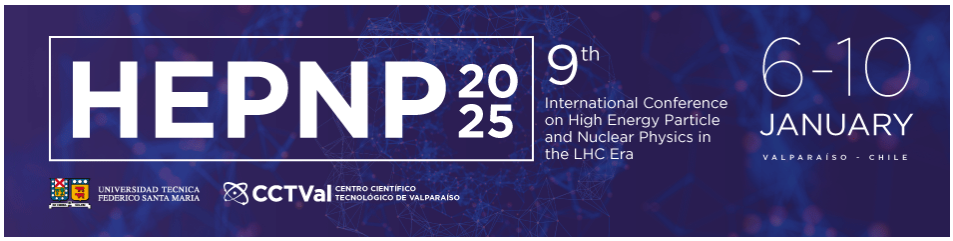

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The Pierre Auger Observatory: Latest Results and Prospects

Friday 10 January 2025 09:40 (35 minutes)

The Pierre Auger Observatory, the largest and most accurate ultra-high-energy cosmic ray observatory (UHECRs) in the world, located in the province of Mendoza, Argentina, uses a hybrid design composed of two detection systems: a network of 1660 water-Cherenkov detectors, distributed over an area exceeding 3000 km², and 27 fluorescence telescopes that monitor the atmosphere above the surface detector array. Since the beginning of its operations, the Pierre Auger Observatory has produced noteworthy results that have expanded our knowledge in the field of astroparticle physics. Among its main advances, it was discovered that the composition of UHECR becomes lighter for energies up to approximately 2 EeV, shifting towards a heavier composition at higher energies. Furthermore, it has been proven with high significance that the UHECRs above the ankle are predominantly from extragalactic sources. The Observatory is currently undergoing an important upgrade, called AugerPrime, which aims to further expand its capabilities for the next decade of measurements. This upgrade includes the addition of plastic scintillation detectors and radio antennas to the surface Cherenkov detectors, along with an upgrade of electronic systems to accommodate the new detectors and improve experimental efficiency. This contribution will present an overview of the most significant results, including recent spectrum measurements, searches for anisotropies in arrival directions, primary mass composition and an outline of prospects for the coming years of AugerPrime operations.

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