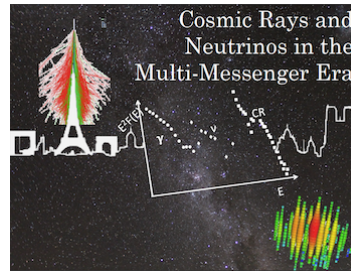


Cosmic Rays in the Multi-Messenger Era



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The Underground Muon Detector of the Pierre Auger Observatory

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Ultrahigh-energy cosmic rays are a mystery at the frontier of high-energy particle physics and astronomy. The Pierre Auger Observatory is currently the largest detector for ultrahigh-energy cosmic rays in the world and will continue to search for the origins of cosmic rays at the highest energies in its second phase of operation. We will present the potential and the functionality of the Underground Muon Detector (UMD) that will allow for a direct measurement of the muon component in air showers providing the Pierre Auger Observatory an enhanced sensitivity of the primary mass of ultrahigh-energy cosmic rays. The UMD is being deployed as a part of a greater upgrade named AugerPrime, which will make Auger an event-by-event mass-sensitive observatory for cosmic-ray physics and multi-messenger astronomy. The UMD will be mostly efficient at primary energies above $10^{16.5}$ eV and will primarily be used to directly measure the mass composition in the cosmic ray spectrum below the ankle region and to enhance the capabilities of photon-hadron discrimination at these energies.

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