



Contribution ID: 145

Type: not specified

Searches for anisotropy in arrival directions of UHECRs with the Pierre Auger Observatory: updates and prospects

Wednesday, September 13, 2023 4:30 PM (15 minutes)

The origin of cosmic rays has been one of the motivating questions of the astrophysics field for over a century, an open and exciting topic since then. To help answer this question, the Pierre Auger Observatory investigates the anisotropies of the ultra-high-energy cosmic rays (UHECRs) —with energies above ~ 32 PeV —at small, intermediate, and large angular scales. The Observatory has been collecting data for over 19 years, reaching more than $135\,000\text{ km}^2\text{ yr sr}$ of accumulated exposure, with the surface detectors spread over 3000 km^2 . So far, the most significant discovery is a large-scale dipole structure with a total amplitude of approximately 7%. This results from the observed modulation in right ascension in the inclusive energy bin above 8 EeV, where the computed dipole equatorial component has a statistical significance of over 5σ . In this contribution, we present the latest updates on anisotropy searches. In addition to the limits on modulation in right ascension constrained from ~ 32 PeV to ≥ 32 EeV, the results outlined in this presentation include catalog-based and overdensity searches, with a reported excess around the Centaurus region. Finally, we discuss the prospects of anisotropy searches in light of mass-composition information of Phase II of the Pierre Auger Observatory, AugerPrime.

Primary author: MARTINS, Edyvania Emily (on behalf of the Pierre Auger Collaboration)

Presenter: MARTINS, Edyvania Emily (on behalf of the Pierre Auger Collaboration)

Session Classification: CCR: Charged Cosmic Ray

Track Classification: Charged Cosmic Rays