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”The ASTRI Mini-Array: a breakthrough in the Cosmic Ray study”

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Despite the enormous efforts done in very recent years, both theoretically and experimentally, the basic three questions about the CR origin remain without clear answers: what are their sources, how are they accelerated, how do they propagate?

Gamma-ray astronomy plays a fundamental role in this field. Both relativistic protons and electrons can emit in the gamma-ray band with different processes but only the detection of hadronic gamma-ray emission is a direct proof of Cosmic-Ray acceleration. Distinguishing leptonic and hadronic components is one of the most tricky issues in high energy astrophysics, however, a gamma-ray detection at about 100 TeV would be a direct proof of the hadronic origin of the emission. Consequently, not only would it directly confirm the presence of CR acceleration in a source but also it gives us a large amount of information about their sources, their parent protons and their propagation. The ASTRI Mini-Array, with its unprecedented sensitivity at E > 10 TeV, will provide a fundamental contribution to close some of the most important CR open issues. It will provide fundamental additional data at the highest gamma-ray energies for some candidate Pevatron sources, confirming or disproving their hadronic nature. In the same way, its observations will bring a breakthrough in the understanding of the Crab 100 TeV emission and of the diffusion coefficient behavior near some Supernova Remnants. In this talk, some of the most important results expected by the ASTRI MA are illustrated.

Keywords

Gamma-ray, Cherenkov Telescopes, origin of cosmic rays, pevatrons. radiation processes

Collaboration

other (fill field below)

other Collaboration

ASTRI Mini-Array

Subcategory

Experimental Results

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