

Axion-photon conversion of LHAASO multi-TeV and PeV photons

The Large High Altitude Air Shower Observatory (LHAASO) has reported the detection of a large number of multi-TeV-scale photon events including also several PeV-scale gamma-ray-photon events with energy as high as 1.4 PeV. The possibility that some of these events may have extragalactic origins is not yet excluded. Here we propose a mechanism for the traveling of very-high-energy (VHE) and ultra-high-energy (UHE) photons based upon the axion-photon conversion scenario, which allows extragalactic above-threshold photons to be detected by observers on the Earth. We show that the axion-photon conversion can serve as an alternative mechanism for the very-high-energy features of the newly observed gamma ray burst GRB 221009A.

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