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Estimating the GZK Photon Flux from Extragalactic Cosmic Rays

Charged cosmic-ray particles interact with the cosmic microwave background during their propagation over extragalactic distances. In the interaction known as the Greisen-Zatsepin-Kuzmin (GZK) effect, so-called GZK photons are generated via photo-pion production at ultra-high energy. The flux of GZK photons at Earth depends on different parameters of the cosmic-ray spectrum such as the spectral index or potential cutoffs. Other parameters such as the distances of the cosmic-ray sources or the mass composition of the cosmic rays themselves have an impact on the expected fluxes as well. Simulations based on different input parameters have been performed with the CRPropa code and the expected GZK photon fluxes will be presented. The goal is to update the allowed range of the expected GZK photon flux based on current measurements of cosmic-ray observatories at ultra-high energies.

Collaboration(s)

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