

Abstract

Ultra high energy cosmic rays are particles (mainly protons) with energy more than 10^{18} eV. As these particles travel in the extragalactic space, they can interact with cosmic microwave background radiation (CMB) and lead to the production of pions. For this reason and some astrophysical observations we don't expect to observe these cosmic rays. This is the GZK cut-off. But in real observations this cut-off hasn't been seen. This confronts us with an anomalous condition. We discuss the Lorentz invariance violation models for this anomaly, which produce some bounds on the Planck scale physics. Also, We discuss briefly the aspects of Lorentz invariance violations in the Standard Model of particle physics and phenomenological extensions of Standard Model.