

Constraining Lorentz Invariance Violation using the muon content of extensive air showers measured at the Pierre Auger Observatory

measured at the Pierre Auger Observatory

Executive Summary



Caterina Trimarelli^a for the Pierre Auger Collaboration^b

^a Università dell'Aquila and INFN Laboratori Nazionali del Gran Sasso, Assergi (L'Aquila), Italy

^b Observatorio Pierre Auger, Av. San Martín Norte 304, 5613 Malargüe, Argentina



What is this contribution about?

In this contribution, the Lorentz Invariance Violation (LIV) was constrained using the muon content distribution of extensive air showers.

Why is it relevant/interesting?

For the first time, LIV effects were studied considering the muon fluctuation of extensive air showers measured at the Pierre Auger Observatory.

What has been done?

After having introduced LIV as a perturbation term in the single-particle dispersion relation, a library of simulated showers was produced. In the presence of LIV, an increase in the average number of muons at ground and a decrease in the relative fluctuations were observed.

What is the result?

Considering the dependence of the decrease of the relative fluctuations on the different violation strengths, a new bound for the LIV parameter was obtained.

