

Search for CPT and Lorentz Violation Effects in the Muon $g-2$ Experiment at Fermilab

Wednesday, 29 July 2020 16:00 (15 minutes)

The Muon $g - 2$ Experiment at Fermilab measures the anomalous magnetic moment of the muon, a_μ , with improved precision compared to the previous experiment at Brookhaven National Lab (BNL).

The value of a_μ from BNL currently differs from the Standard Model prediction by ~ 3.6 standard deviations or higher, suggesting the potential for new physics and therefore, motivating a new experiment.

The Fermilab experiment follows the measurement principles of the BNL experiment, injecting a beam of positive muons into a storage ring, which focuses the beam with a combination of magnetic and electric fields. The muon anomaly relies on the measurement of the spin precession frequency ω_a about the muon momentum.

The study and analysis of CPT and Lorentz violation in $g-2$ provide a good test of the standard model (SM) as well as strong

constraints on new physics. The BNL $g-2$ experiment analyzed the spin precession frequency of the muons stored in the ring and searched for two Lorentz and CPT violating signatures. One of those signatures, the sidereal variation of $\omega_a(t)$, will be discussed for the Fermilab Muon $g-2$ Experiment in this presentation. This talk will present the methodology and give a status update on the Run 1 analysis.

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