

A New Measurement of the Positive Muon Anomalous Magnet Moment to 0.46 ppm



Hogan Nguyen

Fermilab

Senior Scientist

Abstract:

I present a new measurement of the positive muon anomalous magnetic moment $a_\mu = (g_\mu - 2)/2$ from the Fermilab E989 experiment. The quantity a_μ is an exquisite probe of the quantum corrections of the muon interaction with the electromagnetic field. The experiment is a follow up of the BNL E821 experiment, which saw a 3.7σ discrepancy from the Standard Model. Due to the implications of possible new physics, it is of great interest to either confirm or refute the BNL result. Our experimental technique utilizes the muon storage ring that was moved from BNL to Fermilab in 2015. I will review the theory predictions and present our experimental technique, highlighting the innovations made by E989. I present our first result based on a data set consisting of about 8 billion analyzed muon decays. This result, representing only 6% of our expected final dataset, achieved an error of 0.46 ppm which is comparable to the BNL result.

