

Fermilab Muon g-2 Experiment: Current Status

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The anomalous magnetic dipole moment of the muon can be both measured and computed to very high precision, making it a powerful probe to test the standard model and search for new physics such as SUSY. The previous measurement by the Brookhaven E821 experiment found a ~ 3 standard deviation discrepancy from the predicted value. The new g-2 experiment at Fermilab will improve the precision by a factor of four through a factor of twenty increase in statistics and a reduced systematic uncertainties with an upgraded apparatus. A central component to reach this fourfold improvement in accuracy is the high-precision laser calibration system, which is designed to monitor the gain fluctuations of the calorimeters (photo-detectors) at 0.04% accuracy during the time muons are revolving inside the storage ring (700 μ sec). Over longer data collection periods the goal is to keep systematics contributions due to gain fluctuations at the sub-percent level. The experiment will also carry out an improved measurement of the muon electric dipole moment. BNL statistics has already been crossed in Run-1 (JUL. 2017 - OCT. 2018). The laser calibration pulses are also used (prior to data taking), to simulate physics events and to test the calorimeters. We report here the current status of the experiment, and specifically the laser calibration system, and some results with real data.

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