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Muon g-2 Experiment at Fermilab: First Run

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Precision measurements of the anomalous magnetic moment of the muon, a_μ , are a stringent test of the Standard Model. The last measurement of a_μ at Brookhaven National Laboratory differs from the Standard Model prediction by $3-4\sigma$ – a possible indication of New Physics. A successor to this experiment has been constructed at Fermilab, with the aim of reducing the experimental uncertainty by a factor of four to 140 ppb. The measurement technique adopts the storage ring concept used at Brookhaven, with muons contained in a highly uniform magnetic dipole field. The spin precession frequency is extracted from the modulation of the rate of higher-energy positrons from muon decays, detected by 24 calorimeters and 3 straw tracking detectors. Compared to the previous experiment, muon beam preparation, storage ring internal hardware, field measuring equipment, and detector and electronics systems are all new or significantly upgraded. In this talk, a brief overview of the theoretical value of a_μ will be given, followed by an overview of the experiment. Data from the run will be presented and the current status, including the anticipated timeline for a new result, will be outlined.

Primary author: MOTT, James

Presenter: MOTT, James

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