

# Beam dynamics corrections to the Run-1 measurement of the muon anomalous magnetic moment at Fermilab

Wednesday 8 September 2021 16:00 (30 minutes)

## ABSTRACT

The Fermi National Accelerator Laboratory (FNAL) Muon  $g - 2$  Experiment has measured the positive muon magnetic anomaly  $a_\mu \equiv (g_\mu - 2)/2$  with a precision of 0.46 parts per million, with data collected during its first physics run in 2018. The FNAL experimental result, combined with the measurement from the former experiment at Brookhaven National Laboratory, increases the tension with the Standard Model expectation to  $4.2\sigma$ , thus strengthening possible hints for new physics.

The magnetic anomaly is determined from the precision measurement of the muon spin precession frequency relative to the momentum vector ( $\omega_a$ ), and the average magnetic field experienced by the beam. The *in situ* straw-tracking detectors are crucial to the evaluation of the beam dynamics properties, by providing detailed time-dependent stored-muon spatial profiles in two areas of the storage ring.

This talk presents the beam dynamics systematic corrections that are required to adjust the measured muon precession frequency  $\omega_a^m$  to its true physical value  $\omega_a$ .

## Working group

WG3

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