Abstract Submitted
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The Pitch and Electric Field Corrections to the Anomalous Muon Spin Precession Frequency for the Muon $g-2$ Experiment[1] TYLER BARRETT, ANTOINE CHAPELAIN, DAVID RUBIN, JOSHUA FAGIN, Cornell University, JAMES MOTT, Fermilab / Boston University, MUON G-2 COLLABORATION — The Muon $g-2$ Experiment (Fermilab E989) aims to measure the muon's anomalous magnetic moment, $a_\mu = (g_\mu - 2)/2$, to a precision of 140 parts-per-billion (ppb). The measurement is performed by observing the anomalous spin precession frequency ω_a of a muon ensemble within a magnetic storage ring. The measured precession frequency is directly proportional to a_μ, up to perturbations from two primary beam dynamics effects which must be corrected. One effect arises from vertical oscillations within a vertically focusing electric quadrupole field, called the pitch correction. Another arises from the quadrupoles' radial electric field, called the electric field correction. Both effects can perturb ω_a by hundreds of ppb, and must be carefully determined in order to reach the target precision for a_μ. Here we present the methodology and results for the pitch and electric field corrections from the experiment's Run-1 measurement period.

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