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The Phase-Acceptance Effect in Run 1 of the Fermilab Muon g-2 Experiment[1] RENEE FATEMI, Univ of Kentucky, FERMILAB G-2 EXPERIMENT (E989) COLLABORATION — The Muon g-2 Experiment (E989) at Fermilab is measuring the anomalous magnetic moment of the muon, a_μ, with improved precision compared to the Brookhaven (E821) experiments whose results were found to be inconsistent with the Standard Model. Muons are injected and stored in a circular ring, with a magnetic dipole field and an electrostatic quadrupole system (EQS) providing radial and vertical focusing. During the first full physics run in 2018 the potential on a subset of the plates in the EQS exhibited an unexpected time dependence throughout the muon storage period. This led to a time dependent vertical position and width of the beam, which when coupled with the finite acceptance of the calorimeters, translated directly to a time dependence of the average muon phase (the angle between the muon momentum and spin vectors) at the time of injection. This phase-acceptance effect results in a pull on the extraction of the anomalous precession frequency of the muon and is one of the leading systematic errors associated with the analysis of the run 1 dataset. Techniques used to quantify the pull on a_μ and associated systematic errors will be discussed.

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