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Q-method Analysis for the Muon g-2 Experiment at Fermilab FANG HAN, TIM GORRINGE, WESLEY GOHN, RENEE FATEMI, LAURA KELTON, Univ of Kentucky, MUON G-2 COLLABORATION — The Muon g-2 Experiment (E989) at Fermilab aims to measure muon anomalous magnetic moment a_μ to a precision of 140 ppb. Experimentally a_μ is extracted from the precise measurement of the storage ring magnetic field B and the anomalous precession frequency ω_a. E989 plans to reduce the statistical errors by a factor of four compared to the most recent measurement. Such a goal is only worthwhile if the systematic errors are well controlled. The previous measurement extracted ω_a by a method based on fitting of calorimeter pulses and constructing the time distribution of high-energy positrons. A new technique called Q-method is also proposed for E989 and is now under development. The Q-method extracts ω_a from the variation of the integrated energy deposited in the calorimeters by the decay positrons. Compared to the standard method, the Q-method has reduced sensitivity to pulse pile-up and time-dependent gain change although greater sensitivity to time-dependent pedestal variations. This talk will discuss the merits of the Q-method analysis and provide an update on the state of the analysis as g-2 embarks on its first physics run.

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