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Magnetic Field Analysis for Fermilab Muon $g-2$[1] ALEC TEWSLEY-BOOTH, Univ of Michigan - Ann Arbor — The Muon g-2 experiment E989 at Fermilab measures the anomalous magnetic moment of the muon a_μ with improved precision compared to the Brookhaven (E821) experiments. The Brookhaven results are in tension with the Standard Model by more than 3σ. The determination of a_μ requires the measurement of both the muon anomaly frequency ω_a and the magnetic field B that confines muons in a storage ring. The field is monitored by a set of coordinated nuclear magnetic resonance (NMR) measurements. NMR probes at fixed locations above and below the storage region constantly monitor the field. An in-vacuum trolley equipped with 17 NMR probes maps the muon storage region, and a special water-based NMR probe provides the calibration for the trolley probes. This presentation focuses on the determination of the time-dependent field maps from combining the fixed probe measurements and the trolley maps. The field maps are combined with the muon distribution to derive the average field observed by the muons during the measurement. This talk will cover the analysis from the first data run.

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