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Extracting the muon-weighted magnetic field for the Muon $g-2$ experiment[1] BRYNN MACCOY, University of Washington, FERMILAB MUON G-2 EXPERIMENT (E989) COLLABORATION — The Fermilab Muon $g-2$ experiment is measuring a_μ, the anomalous magnetic moment of the muon, to high precision. The previous-generation experiment at Brookhaven National Lab measured a value of a_μ that differs by 3.7σ from the recently published Standard Model compilation White Paper. Results from the Fermilab Run-1 data taking campaign, with an expected precision approximately equal to the final BNL result, are being released soon. To obtain a_μ, two measurements are required: the anomalous muon precession frequency (ω_a) and the magnetic field (B) experienced by the muons in the storage ring. A system of pulsed NMR probes positioned outside the storage region tracks B during physics running, and a trolley carrying 17 NMR probes periodically maps B inside the storage region. To determine the average field used in the a_μ result, the measured B is first weighted by the spatial and temporal distribution of the muon beam, then averaged. Straw trackers reconstruct the beam at two locations in the ring. Dynamic effects change the beam distribution as a function of both azimuth and time. The final analysis of the muon-weighted magnetic field and its sources of uncertainty for Run-1 will be presented.

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