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Transient Field Excursions in the muon g-2 Storage Ring at Fermilab¹ ERIK SWANSON, University of Washington, THE MUON G-2 COLLABORATION — The Muon g-2 experiment E989 at Fermilab measures the anomalous magnetic moment of the muon $a\mu$ with improved precision compared to the Brookhaven E821 experiment, the results of which are in tension with the Standard Model. Determining $a\mu$ requires measurements of both the muon spin precession frequency $w\mu$ and the magnetic field B. The magnetic field is monitored by coordinated nuclear magnetic resonance (NMR) measurements. NMR probes at fixed locations above and below the storage region continuously monitor the field. An in-vacuum trolley with 17 NMR probes infrequently maps the muon storage region, and a special water-based NMR probe provides calibrations for the trolley probes. While the magnetic field of the storage ring is generally changing very slowly, there are additional fast field changes that are happening at time scales shorter than the typical 1ms long NMR signals. This presentation will focus on observed field changes that require special analysis and understanding to determine their effect on the field observed by the stored muons.

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