

Beam dynamics corrections to the anomalous spin precession frequency in the Muon g-2 experiment at Fermilab

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The Muon $g-2$ experiment at Fermilab aims to measure the magnetic anomaly of muon to 140 parts-per-billion precision, which is about four times more precise than the predecessor experiment at Brookhaven National Laboratory. To that end, the experiment not only requires the accumulation of 21 times more of the detected positrons but a much better understanding and, thus, reduction of the systematic errors. An extensive analysis of correcting the systematic effects and assessing the corresponding systematic uncertainties was conducted and published for the Run-1 result in April 2021. This talk focuses on and summarizes the beam dynamics aspects of those systematic corrections to the anomalous spin precession frequency measurement. A few key differences in the Run-1 and the ongoing Run-2/3 analysis process will be briefly covered.

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