

New Perspectives



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Muon g-2: An Overview

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The Muon g-2 experiment at Fermilab measures the magnetic moment of the muon by studying the behavior of muons as they orbit in a magnetic storage ring. Measuring muon precession frequencies relative to magnetic field strength and correcting for a wide array of factors lets us determine the magnetic moment anomaly $a_\mu = (g-2)/2$ to very high precision. The motivation behind this effort is to investigate a possible discrepancy between the real muon magnetic moment anomaly and its value predicted by the standard model. This discrepancy was first identified twenty years ago in an experiment at Brookhaven National Laboratory, but the uncertainty at the time was too high for a conclusive discovery. Now, g-2 aims to reduce this uncertainty by a factor of four, determining at long last whether the standard model prediction is wrong. Such a discovery could revolutionize the field, opening the door to new initiatives delving for the first time into experimentally-observable physics beyond the standard model.

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