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The Muon $g-2$ Experiment at Fermilab and the Search for New Physics

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Precision measurements at low energies complement direct measurements at high energy colliders in the search for new physics. For instance, the muon $g-2$ experiment at Fermilab will measure the muon anomalous magnetic moment a_μ to 140 ppb, a four-fold improvement over the previous measurement at Brookhaven. The result will be compared with one of the most precise predictions of the Standard Model, accurate to 370 ppb (8 significant figures), as a test of the completeness of the Standard Model, with broad sensitivity to new particles and interactions. Similarly, a program of precision measurements at JLab is underway, where the Møller measurement of parity-violation in e-e scattering, a 33 ppb asymmetry to be measured to 0.7 ppb, will determine the weak mixing angle with unmatched accuracy at low Q^2 , providing sensitivity to new neutral currents with origins beyond the Standard Model and other new physics spanning the MeV to multi-TeV scale. The status and role of experiments at low energy in the search for new physics will be described.

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