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High precision calculation of the hadronic vacuum polarisation contribution to the muon anomaly

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We present a new lattice QCD calculation of the leading order hadronic vacuum polarization contribution to the muon anomalous magnetic moment a_{μ} with a 40% reduction of the uncertainties. The short and intermediate distance window contributions are computed on 28 ensembles with 6 different lattice spacings, while the (small) long distance contributions are obtained using input from experiments in a low-energy regime where they all agree. Combined with other standard model contributions our result leads to a prediction that differs from the measurement of a_{μ} by only 0.9 standard deviations. This provides a remarkable validation of the standard model to 0.37ppm.

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