

The Discrepancy Between tau and e+e- Spectral Functions Revisited and the Consequences for the Muon Magnetic Anomaly

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We revisit the procedure for comparing the $\pi\pi$ spectral function measured in tau decays to that obtained in e^+e^- annihilation. We re-examine the isospin-breaking corrections using new experimental and theoretical input, and find improved agreement between the $\tau^- \rightarrow \pi^- \pi^0 \nu_\tau$ branching fraction measurement and its prediction using the isospin-breaking-corrected $e^+e^- \rightarrow \pi^+\pi^-$ spectral function, though not resolving all discrepancies. We recompute the lowest order hadronic contributions to the muon $g-2$ using e^+e^- and tau data with the new corrections, and find a reduced difference between the two evaluations. The new tau-based estimate of the muon magnetic anomaly is found to be 1.9 standard deviations lower than the direct measurement.

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