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The hadronic running of the electromagnetic coupling and electroweak mixing angle (Part II)

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We discuss the conversion of our lattice result for the hadronic running of the electromagnetic coupling, $\Delta\alpha(-Q^2)$, computed for Euclidean momenta into an estimate for $\Delta\alpha_{\text{had}}^{(5)}(M_Z^2)$ using the Euclidean split technique (Adler function approach). We focus specifically on the running in the spacelike regime from momentum scales below 7 GeV^2 up to M_Z^2 , which can be determined either in perturbative QCD or by using dispersion theory and experimentally determined hadronic cross sections. A detailed comparison with results from other lattice calculations and phenomenology is performed. We present an in-depth discussion of the relation to lattice estimates of the hadronic vacuum polarisation contribution to the muon $g - 2$ and the implications for global electroweak fits.

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