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Hadronic vacuum polarization from step scaling

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It is well known that the electromagnetic coupling constant α is an energy scale dependent quantity. Some of these dependencies originate from hadrons and can therefore be computed using Lattice QCD. The value at the mass of the Z boson is of particular interest. The large energy range makes a direct simulation unfeasible, so it has to be split up into several ranges. Setting the scale of the smaller and finer lattices, which cover the higher energies, is a challenging task. We present a general method to handle this issue in lattice gauge theories. A test of this strategy in two-dimensional QED is done and the hadronic vacuum polarization is computed on an energy range that spans two orders of magnitude.

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