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Improved gradient flow for step scaling function and scale setting

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The gradient flow renormalized coupling offers a relatively inexpensive way to calculate the step scaling function or the lattice scale, but both applications can be hindered by large lattice artifacts. Recently we introduced an empirical non-perturbative improvement that can remove O(a^2) lattice artifacts. The method is easy to implement and can be applied to any lattice gauge theory of interest both in step scaling studies and for scale setting. In this talk I will briefly review this improvement method and discuss its application to 4, 8 and 12 flavor systems in step scaling function studies and for scale setting in 2+1+1 flavor QCD.

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