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Universality and cutoff effects of pure gauge theories from gradient flow scales

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The approach to the continuum stands as one of the main sources of uncertainty in lattice studies. Recent investigations revealed complicated functional forms for the lattice cutoff effects, making continuum extrapolations possibly very difficult in practice. By using gradient flow scales we study the continuum scaling of Yang-Mills theories using different lattice gauge actions at the currently used lattice spacings. We first show how this can be done using flow observables defined at different scales, and argue that to keep systematic errors under control the comparison between several lattice actions is required, together with the use of finer lattices. Moreover, by combining flow scales with lattice perturbation theory we discuss the difficulty in controlling the perturbative and scaling corrections in precise determinations of the Λ parameter

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