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Polyakov loop renormalization with gradient flow

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We propose to use gradient flow for the renormalization of Polyakov loops in various representations. We study Polyakov loops in 2+1 flavor QCD using HISQ action and lattices with temporal extents $N_t=6,8,10$ and 12 in various representations, including fundamental, sextet, adjoint, decuplet, 15-plet and 27-plet. This alternative renormalization procedure allows the renormalization over a large temperature range from $T=100$ up to $T=1000$ MeV, with small errors not only for the fundamental but also for higher representations of the Polyakov loop. We discuss the Casimir scaling of the Polyakov loops and also compare with weak coupling results.

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