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Testing the Witten-Veneziano Formula on the Lattice

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We employ lattice techniques to compute both sides of the Witten-Veneziano formula.
For the one side we perform dedicated quenched simulations
and use the spectral projector method to determine the topological
susceptibility in pure Yang-Mills theory. The other side we determine
in lattice QCD with $N_f = 2 + 1 + 1$ dynamical Wilson twisted mass fermions
including for the first time also the flavour singlet decay constant.
Taking the continuum and the SU(2) chiral limits we compare
both sides and find good agreement within uncertainties.

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