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The glueball spectrum at large N

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Using variational techniques, we measured the masses of the ground-state glueballs and some of their excitations in all the irreducible representations of the cubic group in $SU(N)$ gauge theories for N ranging from 3 to 8, at fixed lattice spacing in the scaling region, where some features of the continuum spectrum are already manifest. For this calculation, we developed an automated method for generating traced loops in all irreducible representations of the cubic group starting from a given closed path; this enabled us to extract glueball masses from a variational basis typically consisting of 40-60 trial operators. Our data show that there is a mild N -dependence of the spectrum, with a modest $1/N^2$ correction, confirming earlier large- N results on a much wider portion of the low-energy spectrum. Our automated method for constructing trial operators allows us to address directly the issue of mixing with scattering and torelon states.

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talk

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