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The imaginary- θ dependence of the $SU(N)$ spectrum

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In this talk we will report on a study of the θ -dependence of the string tension and of the mass gap of four-dimensional $SU(N)$ Yang-Mills theories. The spectrum at $N=3$ and $N=6$ was obtained on the lattice at various imaginary values of the θ parameter, using Parallel Tempering on Boundary Conditions to avoid topological freezing at fine lattice spacings. The coefficient of the $O(\theta^2)$ term in the Taylor expansion of the spectrum around $\theta=0$ could be obtained in the continuum limit for $N=3$, and on two fairly fine lattices for $N=6$.

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