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Loop formulation of supersymmetric Yang-Mills quantum mechanics

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The conjectured holographic duality between supersymmetric Yang-Mills quantum mechanics and type IIA string theory in principle allows to probe the physics of certain supergravity black holes by lattice Monte Carlo simulations. In this talk we derive the fermion loop formulation of the 4 and 16 supercharge $SU(N)$ theory on the lattice. The loop formulation naturally separates the contributions to the partition function into its bosonic and fermionic parts and hence provides a way to control a potential fermion sign problem arising from the Pfaffian phase. We present first numerical results for the theories at large values of N and down to low temperatures.

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