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E1: Effective Z_3 model for finite density QCD with tensor networks

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The tensor renormalization group is a promising numerical method used to study lattice statistical field theories. However, this approach has been prohibitively expensive in 2+1 and 3+1 dimensions until recently. Here we use relatively new tensor renormalization group methods to study an effective three-dimensional Z_3 model for the heavy-quark, high-temperature, strong-coupling limit of single-flavor 3+1 dimensional quantum chromodynamics. Our results are cross-checked using worm Monte Carlo. We present the phase diagram of the model through the measurement of the Polyakov loop, the nearest-neighbor Polyakov loop correlator, and their susceptibilities. The tensor renormalization group results are in good agreement with the literature.

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