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Tensor renormalizaton group calculation for the phase structure of the CP(1) model in the presence of a topological term

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We calculate the free energy of the CP(1) model with a topological term using the tensor renormalization group (TRG) method. TRG calculations allow to use large volumes and to determine the phase structure in the presence of the topological term. In this talk, we will focus on the systematic errors appearing in the calculations and compare our results to previous work. Our TRG calculations with controlled systematic errors can reach precise results for mapping out the phase diagram.

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