

Abstract Submitted
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Phase transition detection using Renyi entropy in quantum and classical systems STEPHEN INGLIS, JASON IACONIS, ANN KALLIN, ROGER MELKO, University of Waterloo — By extending the calculation of the Renyi entropy from quantum models [Phys. Rev. B 82, 100409(R) (2010)] to classical modes, we introduce a general procedure to calculate the Renyi mutual information in Monte Carlo simulations. Examining an array of quantum and classical models we show that the mutual information is able to detect general finite temperature phase transitions from different universality classes without knowledge of the specific order parameter or any special thermodynamic estimators. We demonstrate this technique on a standard symmetry breaking phase transition, the classical Ising model and anisotropic Heisenberg model, and a vortex-unbinding transition without a local order parameter, the classical and quantum XY model, and present the details necessary to implement this procedure on other models [arXiv:1210.2403].

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