Bayesian inference of an exotic phase transition in the fundamental theory of strong interactions

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Bayesian inference is used to draw predictions in a modern physics problem. We employ a state-of-the art model for the thermodynamics of the strong interactions. Differential-evolution Markov Chain Monte Carlo is used to extract model parameters in good agreement with first-principles results from the fundamental theory of strong interactions. The model is then used to extrapolate these results to a region which is inaccessible to first principles methods. We predict a second-order phase transition in this region and obtain posterior confidence levels for its location.