

Reliable predictions for cosmological phase transitions

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A first-order phase transition in the early universe would have given rise to a stochastic gravitational wave background which may be observable today. In this talk, I will focus on the crucial problem of making reliable predictions in the face of infrared Bose enhancements at high temperature. Such enhancements break the alignment between the loop and coupling expansions, and typically lead to several orders of magnitude uncertainty in the gravitational wave amplitude. In this context, I will give an overview of recent works analysing the reliability of the coupling expansion at high temperature, both on its own terms and in comparison with nonperturbative lattice simulations. The results offer concrete encouragement for the prospect of learning about particle physics from gravitational wave experiments, and I will finish by commenting on open questions and future directions.

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