Advancing gravitational wave predictions from cosmological first-order phase transitions



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Thermal nucleation in perturbation theory

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Cosmological first-order phase transitions may have generated an observable gravitational wave background, providing a unique window into physics beyond the Standard Model. A crucial step in predicting this background is the reliable computation of bubble nucleation rates. In this talk, I will discuss how techniques, such as effective field theories, Boltzmann equations and real-time simulations, enhance our understanding of perturbative nucleation rate computations in high-temperature quantum field theories, leading to more robust predictions. I will also highlight remaining challenges in perturbative methods, outlining directions for future progress in this field.

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