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Model-independent energy budget of gravitational waves from a cosmological first-order phase transition

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Cosmological first-order phase transitions are predicted by many new physics models and could have facilitated the generation of the baryon asymmetry. Gravitational waves are a promising tool to study phase transitions in the early universe. In this talk, I focus on the energy budget of such phase transitions, which is an important factor in the prediction of the gravitational wave spectrum. Formerly, this analysis was based mostly on simplified models, such as the bag equation of state. I'll present a model-independent computation of the energy budget, which only depends on the speed of sound in the broken and symmetric phase and a newly defined phase transition strength parameter. I compare our new approach to approximations found in the literature and show that the new, model-independent analysis is typically accurate to the percent level, whereas the former approaches can deviate significantly from the full numerical result.

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