

# Higgsless simulations of first-order phase transitions and gravitational wave production

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Gravitational waves offer a unique probe to the early Universe. A particularly interesting scenario is that of a first-order phase transition, in which bubbles of true vacuum nucleate, expand, and collide, involving the dynamics of surrounding plasma particles. In this talk, we introduce the Higgsless scheme for numerical simulations of sound waves and the resulting gravitational wave production in first-order phase transitions proposed in 2010.00971 and 2209.04369. This scheme integrates out the dynamics of the Higgs field, and thus avoids contamination from the thickness of the scalar walls.

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