Contribution ID: **34** Type: **not specified**

Domain wall networks from first-order phase transitions and produced gravitational waves

Wednesday, 27 July 2022 12:00 (20 minutes)

In the first-order phase transitions(PTs) bubble collision is an important source of gravitational waves(GW). Following this process, the domain walls can be formed when degenerate true vacua occur as a result of the breaking of a discrete symmetry. Using lattice simulations, we study the dynamical evolution of domain walls and compute the produced power spectrum of GWs. It turns out that the network of the domain wall is formed after the completion of PTs and the lifetime of the wall network largely depends on whether or not the degenerate vacua are lifted. We conclude that domain wall networks continue to produce GWs in the aftermath of PTs, leading to dramatically changing the spectral shape and enhancing the magnitude by about one order at lower wave numbers.

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Session Classification: Direct BSM