

Crescendo Beyond the Horizon: More Gravitational Waves from Domain Walls Bounded by Inflated Cosmic Strings

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Gravitational-wave (GW) signals offer unique probes into the early universe dynamics, particularly those from topological defects. We investigate a scenario involving a two-step phase transition resulting in a network of domain walls bound by cosmic strings. By introducing a period of inflation between the two phase transitions, we show that the stochastic GW signal can be greatly enhanced. The generality of the mechanism also allows the resulting signal to appear in a broad range of frequencies and can be discovered by a multitude of future probes, such as Pulsar Timing Arrays, and space- and ground-based observatories. We also offer a concrete model realization that relates the second phase transition to the epoch of inflation. In this model, the successful detection of the GW spectrum peak pinpoints the soft supersymmetry breaking scale and the domain wall tension.

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