Contribution ID: **39** Type: 口頭発表

Revisiting Metastable Cosmic String Breaking

Thursday, August 22, 2024 5:00 PM (30 minutes)

Metastable cosmic strings are gathering attention as potential progenitors of stochastic gravitational wave background. They result from a two-step symmetry breaking $G \to H \to 1$ with $\pi_1(H) \neq 0$ and $\pi_1(G) = 0$, and decay via internal monopole-antimonopole pair creation.
Conventionally, the breaking rate has been estimated by an infinitely thin string approximation, which requires a large hierarchy between the symmetry breaking scales.
We numerically constructed a tunneling path and thus obtained a robust lower limit on the tunneling factor e^{-S} even for mild scale hierarchy. In particular, it is relevant to the cosmic string interpretation of the gravitational wave signals recently reported by pulsar timing array experiments.

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