

Emission of Nambu-Goldstone bosons from semilocal string networks

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Cosmic strings arise from the spontaneous breaking of a $U(1)$ symmetry, which can be either global or local, leading to distinct classes of string solutions. Their energy-loss mechanisms are known to differ significantly, which results in qualitatively different spectra of particles emitted from the string networks. Semilocal strings arise when global and local symmetries are simultaneously broken and combine characteristic features of both local and global strings. As a result, their particle-emission properties cannot be straightforwardly characterized as those of global or local string networks. In this talk, we present results from numerical lattice simulations of semilocal string networks, focusing on their particle-emission properties for the first time. We find that semilocal string networks can efficiently emit Nambu-Goldstone bosons, with particle-emission properties similar to those of axion emission from global string networks. Motivated by this result, we discuss a scenario in which the Nambu-Goldstone bosons acquire a soft-breaking mass and account for the observed dark matter abundance via non-thermal production from the string networks. This work is based on arXiv: 2510.07894.

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