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Loop decay in Abelian-Higgs string networks

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The evolution of cosmic strings, in particular cosmic string loops, has been an open question for a number of years. The dynamics observed by field theory lattice simulations and by the Nambu-goto approximation do not agree, giving big differences in the lifetimes of loops, which for example affects their gravitational wave production.

In this talk we will discuss the results obtained from lattice field theory loop evolution simulations, focusing on loops produced during the evolution of an actual realistic cosmic string network. We show that those loops decay proportional to L , but with a larger proportionality constant than the decay by GW. We see no dependency on the behaviour on the string decay on the string length. Moreover, motivated by recent results that show L^2 decay for loops created by artificially setting up string configurations, we propose another method that confirms the L^2 decay. This shows that the decay proportional to L is intrinsic to network loops, and requires further investigation.

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