

# Evolution of black hole-string networks

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Primordial black holes (PBHs), potentially formed in the early universe, may play a crucial role in cosmology, serving as seeds for supermassive black holes and contributing to the formation of merging black hole binaries observed by LIGO/VIRGO. They have also been proposed as candidates for dark matter. Another scenario involves cosmic strings, hypothetical linear defects predicted by various particle physics models. Recent studies suggest that PBHs and cosmic strings could coexist, forming an interconnected BH-string network that influences their evolution. Depending on how efficiently BHs detach from the network, two scenarios emerge: a “frozen network” where BHs remain connected by stretched strings, or a scenario where BHs detach efficiently and become isolated, potentially leading to detectable gravitational radiation from oscillating string loops. This study aims to simulate the evolution of BH-string networks, particularly their early stages, to determine under what conditions a frozen network forms and how it impacts gravitational wave signals, which could differ from those of standard cosmic strings.

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