

# Radiation from Axion Strings with Adaptive Mesh Refinement

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Axion strings are topological defects that arise in field theories with a spontaneously broken global symmetry, such as the Peccei-Quinn mechanism in QCD. Axion strings radiate axion particles, whose spectrum depends on the dynamics of the cosmological string network. The complex dynamics of the network make both analytic modelling and numerical simulation challenging, such that an accurate prediction of the axion mass is elusive.

We present results from adaptive mesh refinement (AMR) simulations of individual, sinusoidal configurations of axion strings (Drew and Shellard 2022, 2023). We outline quantitative investigations of the massless (axion) and massive (radial) radiation, undertaken by extracting and analysing both modes on a diagnostic cylinder to determine their dependence on the string energy density  $\mu \propto \ln \lambda$ . We also discuss the advantages and complexities of using AMR for string simulations, and outline future directions for this work.

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