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Simulating axion string-wall networks

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The axion mass should be cleanly related to the axion dark matter density through the efficiency of cosmological axion production, allowing constraints to be placed on the mass. A signifcant source of cosmological axion production is the unstable network of axionic cosmic strings and domain walls, regions where the axion field is forced to rise above its vacuum expectation value for topological reasons, which arises from phase transitions in the axion's cosmological history. Accurate simulations of these string-wall networks are crucial for predicting cosmological axion production. However, correctly implementing the string cores has been a major hurdle for simulations of axion string-wall networks. In this talk, I will present a new algorithm for treating the string cores in axion string-wall network simulations.

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