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Primordial Black Holes from Axions

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The QCD axion, as well as more general Axion-Like Particles (ALPs) represent well motivated Dark Matter (DM) candidates. We investigate the possibility that a fraction of the total Axion DM abundance is made of Primordial Black Holes (PBHs). The basic ingredient is the existence of a long-lived network of axionic domain walls attached to strings, which eventually annihilates providing an extra contribution to the total axion abundance. This setup is characteristic of realizations of the QCD axion and of ALPs with domain wall number larger than one.

We show that the collapse of closed domain walls in this network may lead to the formation of PBHs depending on the value of the axion decay constant and on the temperature at which the network decays. This provides an alternative mechanism of PBHs formation, independent from the physics of cosmological inflation.

Parallel Session

Dark Matter, Astroparticle Physics

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