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Electroweak phase transition seeded by DFSZ axion string

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We study the possibility that axion strings in the DFSZ model can act as seeds for the electroweak(EW) first-order phase transition. Unlike the KSVZ case, the DFSZ axion strings can couple to the Higgs sector via a “axion-dependent” portal interaction. We analyze the resulting effective theory and find that string-induced EW bubbles have a different feature from usual bubbles or string-seeded bubbles in KSVZ model. In particular, the profile of the bubble is neither spherically symmetric nor axially symmetric. We study the expansion of this bubble and discuss its cosmological implication.

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