

Proposals for searches of scalar field dark matter using cavity resonators

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We consider scalar field dark matter model with a dilaton-like coupling to electromagnetic field. If the mass of this scalar field falls into the range of hundreds of MHz, it may be detected using cavity resonator techniques similar to those used in the search of the axion dark matter in the ADMX and ORGAN experiments. However, we show that the cavity resonators in these experiments have low sensitivity to the scalar-photon coupling. We propose new cavity resonators with various configurations of electric and magnetic fields that may have a significant sensitivity to the scalar field dark matter. Such resonators may be considered for new dark matter searching experiments in future.

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