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Boson stars, primary photons and phase transition

Friday, 8 July 2022 10:00 (15 minutes)

We analyze the possibility that the dark matter candidate is from the approximate scale symmetry theory of the hidden scalar sector. The study includes the warm dark matter scenario and the Bose-Einstein condensation which may lead to massive dark scalar boson stars giving rise to direct detection through observation of the primary (direct) photons. The dynamical system of the scalar particles, the dilatons, at finite temperature and chemical potential is considered. The fluctuation of the particle density increases sharply within the increasing of the temperature. When the phase transition approaches, the fluctuation of the particle density has the non-monotonous rising when the ground state of the relative chemical potential tends to one with the infinite number of the particles. Our results suggest that the phase transition in the boson star may be identified through the fluctuation in yield of primary photons induced directly by the conformal anomaly. The fluctuation rate of the primary photons grows up intensively in the infra-red to become very large at the phase transition.

In-person participation

Yes

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