

## Dark matter trio in classically conformal theories: WIMP, supercooling, and monopole

Beyond solving the hierarchy problem, classically conformal (CC) theories naturally accommodate dark matter (DM). In this work, we explore the CC  $SU(2)_X$  gauge theory with a triplet dark scalar, uncovering three distinct DM scenarios: WIMP, supercooled DM, and monopole. The production mechanisms are strongly influenced by the CC model's unique first-order phase transition evolution history, which differs significantly from those in non-conformal models. We obtain the viable parameter space for each scenario and investigate the current constraints and future sensitivities at terrestrial experiments and gravitational wave observatories.

**Primary authors:** ZHAN, Cheng-Hao (Beihang Univ.); Prof. XIE, Ke-Pan (Beihang University)

**Presenter:** ZHAN, Cheng-Hao (Beihang Univ.)

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