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Forbidden Conformal Dark Matter at a GeV

Wednesday, September 20, 2023 10:00 AM (30 minutes)

In this talk, I will present a new model of DM where the DM is a composite of a spontaneously broken conformal field theory. The DM is a thermal relic with its abundance determined by the freeze-out of annihilations to dilatons, the Goldstone boson of broken conformal symmetry. If the dilaton is heavier than the DM this is an example of forbidden DM. I will present a fully realistic model that describes this DM candidate and its interactions with ordinary particles with masses in the 0.1-10 GeV range. The conformal phase transition is supercooled and strongly first-order. It can source large stochastic gravitational wave signals consistent with those recently observed at pulsar timing arrays like NANOGrav. The majority of the viable parameter space will be probed by future detectors designed to search for long-lived particles, including most of the region favored by the NANOGrav signal. The rest of the parameter space can be probed at future direct detection experiments.

Author: LEE, Seung J. (Korea University)

Presenter: LEE, Seung J. (Korea University)