

KEK Theory Meeting on Particle Physics Phenomenology (KEK-PH2018 winter) and 3rd KIAS-NCTS-KEK workshop on Particle Physics Phenomenology

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Vector SIMP dark matter

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Strongly Interacting Massive Particles (SIMPs) have recently been proposed as light thermal dark matter relics. Here we consider an explicit realization of the SIMP mechanism in the form of vector SIMPs arising from an $SU(2)_X$ hidden gauge theory, where the accidental custodial symmetry protects the stability of the dark matter. We propose several ways of equilibrating the dark and visible sectors in this setup. In particular, we show that a light dark Higgs portal can maintain thermal equilibrium between the two sectors, as can a massive dark vector portal with its generalized Chern-Simons couplings to the vector SIMPs, all while remaining consistent with experimental constraints.

Presenter: CHOI, Soo-Min (Chung-Ang University)

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