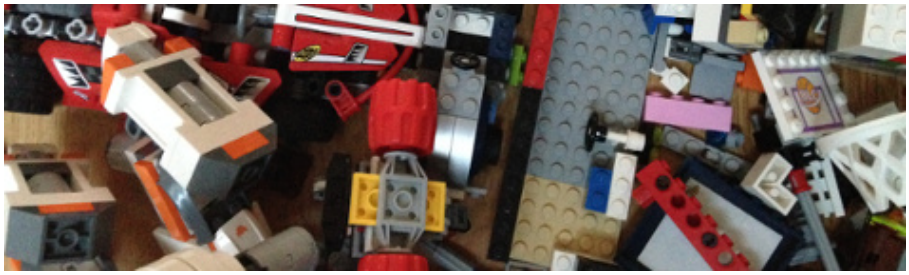

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WIMP dark matter from dilaton exchange

mercredi 5 novembre 2014 15:00 (1 heure)

We study a model in which dark matter couples to the Standard Model through a dilaton of a sector with spontaneously broken approximate scale invariance. Scale invariance fixes the dilaton couplings to the standard model and dark matter fields, leaving only three free parameters: the symmetry breaking scale f, the dilaton mass m_dilaton , and the dark matter mass m_DM. One of these parameters is further fixed by requiring that thermal freeze-out results in the observed dark matter relic abundance. We show that a large parametric region exists where the effective theory is perturbative and produces cold, weakly interacting massive particle dark matter, with f, m_dilaton, m_DM of roughly similar magnitude and in the range ~1-10 TeV. We analyze the experimental constraints on the parameter space from collider, direct and indirect detection experiments, and demonstrate that dilaton exchange provides a consistent, calculable framework for cold dark matter.

Based on: K.Blum, M.Cliche, C.Csaki, and S.J.Lee [arXiv:1410.1873]

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