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Weaker gravity and thermal relic abundance

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A larger Planck scale during an early epoch leads to a smaller Hubble rate, which is the measure for efficiency of primordial processes. The resulting slower cosmic tempo can accommodate alternative cosmological histories. We consider this possibility in the context of extra dimensional theories, which can provide a natural setting for the scenario. If the fundamental scale of the theory is not too far above the weak scale, to alleviate the “hierarchy problem,” cosmological constraints imply that thermal relic dark matter would be at the GeV scale, which may be disfavored by cosmic microwave background measurements. Such dark matter becomes viable again in our proposal, due to smaller requisite annihilation cross section, further motivating ongoing low energy accelerator-based searches. Quantum gravity signatures associated with the extra dimensional setting can be probed at high energy colliders – up to ~ 13 TeV at the LHC or ~ 100 TeV at FCC-hh. Searches for missing energy signals of dark sector states, with masses $gtrsim 10$ GeV, can be pursued at a future circular lepton collider.

Mini Symposia (Invited Talks Only)

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