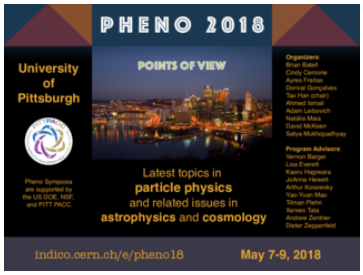

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SIMPs through the axion portal

Monday 7 May 2018 15:30 (15 minutes)

Dark matter could be a thermal relic of strongly-interacting massive particles (SIMPs), where 3⟶2 self interactions set the relic density. This number-changing process has been shown to be generic in theories of chiral symmetry breaking, where the number-changing processes are sourced by the Wess-Zumino-Witten term. Due to conservation of comoving entropy, the 3⟶2 process heats the remaining dark matter. In order for dark matter to form cosmological structure consistent with observation, a cooling mechanism must be present during the time of dark matter freezeout. I will explore models in which an axion-like particle mediates kinetic equilibrium between the dark and visible sectors. I will demonstrate the viability of such models when the pseudoscalars couple to the visible sector via photons or electrons. Interestingly, the visible-sector couplings necessary to produce the observed dark matter relic abundance will soon be probed by experiments.

Summary

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