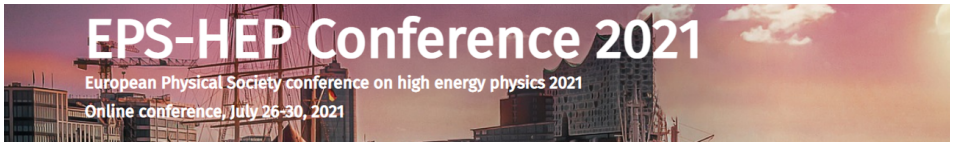

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Dark matter freeze-in from semi-production

We study a novel dark matter production mechanism based on the freeze-in through semi-production, i.e. the inverse semi-annihilation processes. A peculiar feature of this scenario is that the production rate is suppressed by a small initial abundance of dark matter and consequently creating the observed abundance requires much larger coupling values than for the usual freeze-in. We provide a concrete example model exhibiting such production mechanism and study it in detail, extending the standard formalism to include the evolution of dark matter temperature alongside its number density and discuss the importance of this improved treatment. Finally, we confront the relic density constraint with the limits and prospects for the dark matter indirect detection searches. We show that, even if it was never in full thermal equilibrium in the early Universe, dark matter could, nevertheless, have strong enough present-day annihilation cross section to lead to observable signals.

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Collaboration / Activity

Theory

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