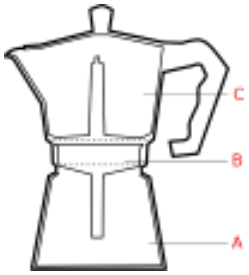

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Boosting Freeze-in through Thermalization

Wednesday 7 October 2020 16:25 (25 minutes)

If the interaction rates between the visible and the dark sectors were never strong enough, the observed dark matter relic abundance could have been produced in the early Universe by non-thermal processes. This is what occurs in the so-called freeze-in mechanism. In the simplest version of the freeze-in paradigm, after dark matter is produced from the standard model thermal bath, its abundance is frozen and remains constant. However, thermalization and number-changing processes in the dark sector can have strong impacts, in particular enhancing the dark matter relic abundance by several orders of magnitude. Here we show that this enhancement can be computed from general arguments as the conservation of energy and entropy, independently from the underlying particle physics details of the dark sector. We also note that this result is quite general, and applies to FIMP production independently of being UV- or IR-dominated.

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