

Freezing-in Cannibal Dark Matter during early matter domination

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If Dark Matter is produced via the freeze-in mechanism during a period of early matter domination, the required portal coupling is enhanced to compensate for the faster expansion of the Universe—especially when the reheating temperature is low. This can lead to experimentally testable scenarios. Moreover, any theory involving scalar Dark Matter naturally includes self-interactions, which induce number-changing processes. These reactions can drive the Dark Matter toward a vanishing chemical potential, even in the absence of thermal equilibrium with the Standard Model. In this talk, I will discuss Dark Matter production under these conditions within a specific model of cannibalistic, self-interacting scalar Dark Matter. I will emphasize how the self-interactions influence both the dynamics of production and the prospects for detection.

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