

Freeze-in Dark Matter in U(1) extended Standard Model and Lifetime Frontier Experiments

Monday 9 November 2020 20:25 (10 minutes)

In the context of a well-motivated gauged U(1) extension of the Standard Model, we introduce a non-thermal dark matter whose interaction is too weak to allow it to be in thermal equilibrium with the Standard Model particles, and its relic density is determined by the freeze-in mechanism through a light mediator that is the extra U(1) gauge boson. We discuss a complementarity between the cosmological constraint on this dark matter physics and the planned/proposed Lifetime Frontier experiments to search for a long-lived particle.

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Session Classification: Dark Sectors and Cosmology