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Dark Matter from Dark QED

Monday 9 January 2023 15:05 (35 minutes)

In this talk, I will present a few novel aspects of dark matter phenomenology, using for illustrative purpose Dark QED, a hidden sector (HS) toy model with fermionic DM interacting with a massive dark photon. I will first discuss a production mechanism valid if the HS interact with the Standard Model with a feeble kinetic mixing parameter. The production mechanism is called sequential freeze-in and is a generalization of freeze-in, but proceeding in two steps, first the production of off-equilibrium dark photons which then produce DM. Next, I will discuss a mapping of thermal DM candidates in the plane T'/T vs mDM, where T'is the temperature of the HS and T that of the Standard Model particles. I will conclude with a brief possible alternative history of the early universe, in which the expansion is dominated by a hot HS.

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