

Testing freeze-in with Z' bosons

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If dark matter interacts too feebly with ordinary matter, it was not able to thermalize with the bath in the early universe. Such Feebly Interacting Massive Particles (FIMPs) would therefore be produced via the freeze-in mechanism. Testing FIMPs is a challenging task, given the smallness of their couplings. In this talk, I will discuss our recent proposal of a Z' portal where freeze-in can be currently tested by many experiments. In our model, Z' bosons with masses in the MeV-PeV range have both vector and axial couplings to ordinary and dark fermions. We place constraints on our parameter space with bounds from direct detection, atomic parity violation, leptonic anomalous magnetic moments, neutrino-electron scattering, collider, and beam dump experiments.

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