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The dynamics and detection possibility of a pseudo-FIMP dark matter

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In a two-component dark matter (DM) set-up, when DM_1 is in equilibrium with the thermal bath, the other one, DM_2 , can be equilibrated only by the sizeable interaction with the DM_1 , even without any connection with the visible-sector particles. We affirm that such DM candidates (DM_2) have unique 'freeze-out' characteristics impacting the relic density, direct, indirect and collider search implications, and propose to classify them as pseudo – FIMP (pFIMP). Here, We have accentuated the dynamics of pFIMP in a model-independent manner by solving the generic coupled Boltzmann Equations (cBEQ), as well as with a concrete model illustration. Also, we have illustrated its detectability for different kinds of model possibilities.

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