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Neutrino Portal to FIMP Dark Matter with an Early Matter Era

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In this talk, I will discuss the freeze-in production of Feebly Interacting Massive Particle (FIMP) dark matter candidates through a neutrino portal, in the case where an early matter-dominated era took place for some period between inflation and Big Bang Nucleosynthesis. In this model, we consider a hidden sector comprised of a fermion and a complex scalar, with the lightest one regarded as a FIMP candidate, and three heavy neutrinos, responsible for mediating the interactions between the Standard Model and the dark matter sectors and for generating the masses of the Standard Model neutrinos. I will present the dynamics of the dark matter candidate throughout the modified cosmic history, evaluate the relevant constraints of the model, and discuss the consequences of the duration of the early matter-dominated era for dark matter production. Finally, I will show that, under some circumstances, this scenario becomes testable through indirect detection searches.

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