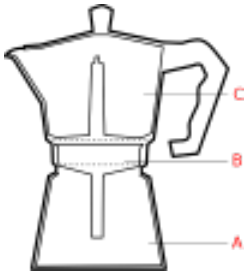

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Neutron star constraints on dark matter

Wednesday 7 October 2020 11:10 (25 minutes)

Due to their extreme density and low temperature, compact objects such as old neutron stars (NS) are efficient probes to unveil interactions between standard model and dark matter (DM) particles. From elastic scatterings on NS matter, DM can get gravitationally trapped by the star. The in-falling DM unavoidably transfers heat to the NS and can heat up old NS up to 1700 K. Moreover, if DM is symmetric, its annihilations inside the NS also heat up old NS to 2400 K, leading to an infrared black body spectrum that is in principle within range of future infrared telescopes. However, such a prospect depend critically on whether captured dark matter thermalizes with the NS core within its lifetime. In this talk, I will discuss the phenomenology of DM thermalization in NS via scattering on fermi-degenerate non-relativistic neutrons and relativistic electrons carefully accounting for the respective kinematics.

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