

Seminar

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On Dark Matter Self Interactions, Viscosity and Cosmic Expansion

In this talk we focus on the self interacting dark matter (SIDM) paradigm which can provide us with a consistent explanation of certain astrophysical observations that are in conflict with the cold dark matter (CDM) paradigm. We will make use of the constraints on SIDM cross-sections from astrophysical observations, to estimate the mean free path of the dark matter particles. Assuming thermalization within this volume we estimate the shear viscosity (η) and bulk viscosity (χ) of SIDM, within kinetic theory formalism. The dissipation due to viscosity affects the solution of Einstein's equation through energy conservation. In a simplified model, we calculate this change and try to argue that $\sigma = m$ constraints on SIDM provide us with sufficient viscosity to contribute significantly to the observed cosmic acceleration at present epoch. We next calculate $H(z)$ and $q(z)$ within the simplified model, and perform χ^2 analysis, using the the cosmic chronometer data, to estimate the best fit model parameters . The best fit values also explain type IA supernova data quite well.

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