

Detection of very small structures of dark matter with direct detection experiments

Tuesday 9 August 2022 16:34 (3 minutes)

The study of the density profile of dark matter (DM) on small scales provides valuable information about the mass distribution within the Galaxy and can predict new compact objects.

We take the sensitivity projections of future direct detection experiments to predict the observation times needed to detect small DM overdensities, assuming a DM cross section close to the current limit of $\sigma_{SI} = 2 \times 10^{-47} \text{ cm}^2$. We present DM power spectrum locally in numerical simulations using a simplistic description. We compare the density imprints of homogeneous DM with those of large overdensities. We then perform statistical tests to show that with a range of (50, 200) numbers of events and observation times of the order of ~ 5 years we can observe structures of size $10^9 h Mpc^{-1}$ with an overdensity of order $\rho/\rho_0 \sim 10$.

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Session Classification: Poster Lightning Talks