

Searching for heavy dark matter in direct detection experiments

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Parameter space near the Planck mass ($\sim 10^{19} \text{ GeV}/c^2$) remains relatively unexplored, while many interesting heavy particle dark matter models exist. Multiply-interacting massive particles (MIMPs) are heavy dark matter particles that interact heavily with regular matter but may have evaded detection due to the low number density required to make up the local dark matter halo. These particles could leave track-like signatures in current experiments, like the MAJORANA Demonstrator and XENON1T, similar to lightly-ionizing particles. In this talk, I extend the current leading WIMP search result from XENON1T single scatter signal to this high-mass regime for MIMPs search, and present a dedicated analysis to search for multiply scattered MIMP track-like signals in XENON1T data.

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