

# Cosmic-ray-boosted dark matter in direct detection and neutrino experiments

*Friday 19 July 2024 20:40 (20 minutes)*

Sub-GeV dark matter particles evade standard direct detection limits since their typical energies in the galactic halo don't allow for detectable recoil of the heavy nuclei in the detectors. It was, however, pointed out recently that if the dark matter particles have sizable couplings to nucleons, they can be boosted by interactions with galactic cosmic rays and also sub-GeV dark matter can be probed. We revisit such bounds based on direct detection experiments, paying particular attention to the attenuation of the boosted dark matter flux where we include the effect of inelastic scattering of the dark matter with nuclei in the Earth's crust. More importantly, we also study the effect of inelastic scattering on dark matter detection, and we calculate the bounds that can be placed by upcoming neutrino experiments like DUNE. We improve on previous works by considering the dark-matter-nucleus inelastic cross sections provided by numerical simulations using the GENIE code.

## Alternate track

### I read the instructions above

Yes

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