## Particle Physics on the Plains 2023



Contribution ID: 9

Type: not specified

## **Boosted Dark Matter Resonant Scattering Theory**

Saturday 14 October 2023 15:25 (18 minutes)

We study the physics of the intermediate scattering regime for boosted dark matter (BDM) interacting with standard model (SM) target nucleons. The phenomenon of BDM, which is consistent with many possible DM models, occurs when DM particles receive a Lorentz boost from some process. BDM may then have relativistic speeds at terrestrial based neutrino detectors and may produce (in)direct DM signatures in these experiments, as opposed to recoil experiments which probe the interactions of the non-relativistic halo of DM in our solar system. We investigate the intermediate scattering regime, between elastic and inelastic events, of such processes involving BDM at energies of order 2 GeV where resonant scattering processes, such as a proton resonating as a delta baryon before decaying back to a proton through the emission of a pi meson, occur. The application of this research is aimed towards implementation with the GENIE code for experiments such as LArTPC at DUNE.

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