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# Fast Moving Dark Matter Interacting with Electrons at Direct Detection Experiments

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Dark matter is one of the most interesting fundamental puzzles of our universe. While we have accumulated sufficient cosmological evidence supporting its existence, the character of the dark matter particle is still unknown. A myriad of models have been proposed, the majority of which introduce a single dark matter candidate for simplicity. Though they provide testable hypotheses at various experiments, little attempt has been made beyond single-candidate dark matter. In this talk, we go beyond single-candidate dark matter by focusing on two-component dark matter candidates. Surprisingly, their phenomenology is very different from that of single-candidate, providing a new avenue for dark matter experiments. In particular, we examine a novel thermal dark matter scenario where present-day annihilation of dark matter in the galactic center or in the Sun may produce subdominant but detectable boosted stable particles via neutral-current-like interactions. We scrutinize various scenarios where such dark matter of spin 0 and 1/2 interacts with electrons via an exchange of vector, scalar, axial-vector or pseudo-scalar mediators. Detailed detection prospects due to high or moderate Lorentz-boosted particles are studied at deep neutrino
experiments and traditional direct detection experiments. The atomic physics effects are studied in detail to account for low electron recoils expected at traditional direct detection experiments. Studying this type of fast moving dark matter at two different sets of experiments targeting different energy ranges allows to cover its parameter space and enhance the signal detection in the future.

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