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Direct detection of non-galactic light dark matter

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A fraction of the dark matter in the solar neighborhood might be composed of non-galactic particles with speeds larger than the escape velocity of the Milky Way. The non-galactic dark matter flux would enhance the sensitivity of direct detection experiments, due to the larger momentum transfer to the target. In this note, we calculate the impact of the dark matter flux from the Local Group and the Virgo Supercluster diffuse components in nuclear and electron recoil experiments. The enhancement in the signal rate can be very significant, especially for experiments searching for dark matter induced electron recoils.

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