

Warsaw Workshop on Non-Standard Dark Matter: multicomponent scenarios and beyond

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Direct detection of self-interacting dark matter

Content :

I will outline the unique direct detection phenomenology which arises if dark matter is self-interacting. The crucial point is that, in the Earth frame, the halo wind interaction with Earth-captured dark matter generically results in a spatially dependent near-Earth dark matter environment. This implies distinctive signatures in the direct detection signal, including latitudinal dependence, and modulation with sidereal day. The sidereal modulation is particularly interesting, since it can only have a cosmological origin. Some examples will be shown from dark matter simulations with dark photon self-interactions. I will then describe some model-independent search strategies for sidereal modulation signals of unknown shape, in the hope of encouraging experimental colleagues to perform such searches.

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