

## Spin-dependent interactions

Due to shrinking of the parameter space for WIMP-scale dark matter, in recent years attention has shifted to probes of sub-GeV dark matter. In this work, we explore the direct detection prospects through single/multiphonon production for dark matter in the keV-GeV mass range, which couples effectively to protons/neutrons via spin-dependent interactions. In particular, we consider coupling the SM to the dark matter through a pseudo scalar, scalar or pseudo vector mediators in the UV and derive the expected reaches of GaAs and sapphire. We find that our results are complementary to the bounds obtained from meson decays and from astrophysical constraints such as supernova SN1987A and dark matter self-interactions.

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