

Phenomenology 2022 Symposium: From Virtual to Real



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Measuring the Migdal Effect with Neutrons

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The Migdal Effect, in which an electron is ejected in a dark matter-nucleus scattering event, provides a powerful probe of sub-GeV dark matter. However, this effect has not yet been experimentally observed and calibrated. We have carefully analyzed the kinematics of neutron-induced Migdal scattering events and propose a detection concept for the Migdal effect that utilizes the standard backing-array techniques used in calibrating low-energy nuclear recoil ionization yields in direct-detection experiments. We analyze the detection potential of Xe and Si. Our calculations serve as an important step in a broader “Migdal program” that will lead to an improved understanding, both theoretical and experimental, of this powerful tool for probing sub-GeV dark matter

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