

Calibrating the Migdal Effect in Semiconductors

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The Migdal Effect has seen a surge of interest in recent years, and has been leveraged to set what are in fact the strongest limits on nuclear recoils of dark matter below masses of a few GeV. While the existence of the Migdal Effect only relies on fairly basic quantum mechanics, the matrix elements involved have never been directly calibrated. I lay out the importance of measuring the Migdal effect through low-energy nuclear recoil calibrations, what sort of signal to expect in such a neutron calibration experiment with a semiconductor target, and propose one such experimental setup that could be capable of performing this calibration using the NEXUS facility at Fermilab.

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