

Phenomenology 2023 Symposium



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Ab-initio all-electron calculation of dark matter–electron scattering rates with emphasis on theoretical uncertainties.

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We present a new calculation of dark matter–electron scattering rates in semiconductors using atomic centered gaussian basis sets within the framework of density functional theory. We treat both core and valence orbitals similarly and compare with prior results, emphasizing the importance of all-electron effects, which enhance dark-matter electron scattering rates at high recoil energies. We also carefully test systematic uncertainties from the choice of basis sets, exchange correlation functionals, and numerical modelling.

Primary authors: Prof. DREYER, Cyrus (Stony Brook University); Prof. FERNANDEZ-SERRA, Marivi (Stony Brook University); Prof. ESSIG, Rouven (Stony Brook University); SINGAL, Aman (Stony Brook University); Dr ZHEN, Cheng

Presenter: SINGAL, Aman (Stony Brook University)

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