

Phenomenology 2023 Symposium



Contribution ID: 82

Type: not specified

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

Monday 8 May 2023 16:30 (15 minutes)

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.

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Session Classification: DM I

Track Classification: Dark Matter