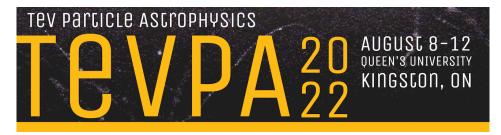
**TeVPA 2022** 



Contribution ID: 76

Type: not specified

## General Dark Matter-Electron Interactions in Detector Materials

Tuesday 9 August 2022 14:20 (20 minutes)

We develop a novel formalism to describe the scattering of dark matter (DM) particles by electrons bound in detector materials such as silicon, germanium and graphene for a general form of the underlying DMelectron interaction. By applying non-relativistic effective field theory methods, we find that the DM and material physics factorise into a handful of DM and material "response functions". The former are obtained by taking the non-relativistic limit of the free amplitude for DM-electron scattering, whereas the latter are expressed in terms electron wave-function overlap integrals and obtained using Density Functional Theory. To illustrate the potential of our formalism, we predict scattering rates for DM-electron interactions that were not accurately tractable before, such as the magnetic dipole interaction.

## **Collaboration name**

Primary author: URDSHALS, Einar Presenter: URDSHALS, Einar Session Classification: Dark Matter

Track Classification: Dark Matter