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ELOISE –Comparing Geant4 simulations at sub-keV against electron energy loss spectroscopy of $CaWO_4$ and Al_2O_3

$CaWO_4$ and Al_2O_3 are well-known target materials for experiments searching for rare events like CEνNS with NUCLEUS or hypothetical dark matter-nucleus scattering with CRESST. In the presence of sub-keV backgrounds of *unknown* origin, like the Low Energy Excess, experiments are also in need for verified and reliable simulations of *known* background components at sub-keV energies, e.g. based on the widely used Geant4 toolkit.

The ELOISE project aims to tackle this issue for electromagnetic particle interactions in both materials. We are currently in the process of evaluating Geant4's accuracy by comparing benchmark simulations with dedicated Electron Energy Loss Spectroscopy (EELS) of $CaWO_4$ and Al_2O_3 at sub-keV energies.

In this contribution, I will briefly describe the problem and outline the scope of ELOISE. Afterwards, I will report the results of ELOISE's EELS measurements. Finally, I will discuss our preliminary comparison with Geant4 simulations of $CaWO_4$ and Al_2O_3 at sub-keV energies.

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