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ELOISE –Reliable background simulation at sub-keV energies

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$CaWO_4$ is a well known target material for the search for Dark Matter (DM) via nuclear recoils caused by the scattering of potential DM particles. It was established as such and is famously used by the CRESST experiment, which has a detection sensitivity down to the 20 eV-scale for nuclear recoils. At this energy scale, a reliable simulation of the signal and its background is crucial.

The recently started ELOISE project will provide reliable simulations of electromagnetic particle interactions in $CaWO_4$ down to O(10eV). However, all standard simulation packages have higher applicability limits. Furthermore, even at this "high"energy, the accuracy is only assessed for few materials but not $CaWO_4$. Within a time scale of four years, ELOISE plans to tackle this issue in a two-stage process: First, to evaluate the accuracy and second, if needed, to develop bespoken simulation code with increased accuracy.

In this contribution we motivate the necessity for reliable sub-keV simulations, identify the resulting challenges, outline ELOISE's approach to overcome them and report the status of ongoing evaluation efforts.

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