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Direct Detection of Nuclear Dark Matter Using Tonne-Scale Experiments

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Summary

Nuclear dark matter models propose a possible composite form of dark matter, dark matter nuclei, which are analogues to Standard Model nuclei. We present possible nuclear dark matter direct detection signals in the DEAP-3600 and XENON1T experiments for a particular class of nuclear dark matter. The number of events required to distinguish between this case and a standard point-like WIMP state is presented for each experiment. We find that, in the most favourable regions of the parameter space, it is possible to distinguish nuclear dark matter from WIMPs at the 3 \sigma level using both experiments in combination, while at best a 2 \sigma distinction is possible individually.

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