



Contribution ID: 952

Type: **Talk in the parallel session**

Halo uncertainties in electron recoil events at direct detection experiments

Friday, 9 July 2021 07:26 (12 minutes)

The dark matter direct detection rates are highly correlated with the phase space distribution of dark matter particles in our galactic neighbourhood. In this paper we make a systematic study of the impact of astrophysical uncertainties on electron recoil events at the direct detection experiments with Xenon and semiconductor detectors. We find that within the standard halo model there can be up to $\sim 50\%$ deviation from the fiducial choice in the exclusion bounds from these observational uncertainties. For non-standard halo models we report a similar deviation from the fiducial standard halo model when fitted with state-of-art N-body simulation while even larger deviations are obtained in case of the observational uncertainties

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Session Classification: Dark Matter Detection

Track Classification: Dark Matter: Dark Matter Detection