Contribution ID: **45** Type: **Talk**

A combined energy scale for WIMP searches in liquid argon with the DarkSide-50 detector

Tuesday 24 July 2018 14:20 (20 minutes)

The DarkSide-50 detector aims to directly detect WIMPs using a liquid argon time-projection chamber. Understanding the energy scale for WIMP interactions is important since it directly maps to a quantitative understanding of WIMP sensitivity.
A combined energy variable is developed where anti-correlation between ionization and scintillation produced by an interaction in liquid argon is taken into account.
This variable can better probe micro-physics parameters relevant for modeling liquid argon detectors.
Preliminary results on electron recombination probability, charge yield, and light yield for electronic recoil energies between 2.8 and 565 keV will be presented and compared to PARIS, the custom-made liquid argon response model.

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Session Classification: 2.3 Direct Detection

Track Classification: Direct Detection