



Contribution ID: 553

Type: **Parallel talk**

Earth-Scattering Induced Modulation in Low-Threshold Dark Matter Experiments

Thursday 31 August 2023 16:45 (15 minutes)

In recent years, the threshold of Dark Matter search experiments has been lowered, enabling the search for Dark Matter-electron scattering. In the region of interest for mass and cross-section that current experiments can reach, the propagation of particles from the Dark Matter wind through the Earth can produce a (sidereal) daily modulation in the observed signal. We explore the modulation signal expected in different materials and show how a significant improvement in the current sensitivity can be obtained in the lower mass region by searching for that daily modulation. Depending on the mediator, mass, and cross-section of interest, we study the dependence of the sensitivity on the latitude of the experiment.

Submitted on behalf of a Collaboration?

No

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Session Classification: Dark matter and its detection

Track Classification: Dark matter and its detection