Contribution ID: **14**   Type: **Plenary**

Implementation of ACTS into LDMX track reconstruction

Tuesday 31 May 2022 14:00 (25 minutes)

The Light Dark Matter eXperiment (LDMX) is a planned electron-beam fixed-target missing-momentum experiment that has unique sensitivity to light Dark Matter in the sub-GeV range.

The tracker is a low-mass, fast, silicon-based detector divided into two sub-detectors: a tagger tracker upstream of the target used to accurately measure the incoming electron and a recoil tracker downstream optimized to maximize the recoil electron acceptance. Both of the trackers are installed within a dipole providing a 1.5 T field with the recoil tracker immersed within the fringe field.

LDMX also features a high-granularity Si-W sampling electromagnetic calorimeter (ECAL), for accurate shower discrimination and minimum ionizing particle tracking and a scintillator based sampling hadronic calorimeter primarily as a background veto detector. Tracking is of paramount importance to LDMX reaching its physics goals as it has to efficiently and precisely reconstruct particles trajectories between 50MeV –8GeV in the trackers, with an accurate treatment of material effects and magnetic field non-uniformity.

Tracking will also be used to reconstruct hadron tracklets in the ECal which are important in rejecting rare photo-nuclear reactions.

For these reasons, the LDMX experiment has implemented a reconstruction framework based on the A Common Tracking Software (ACTS) suite. This talk aims to report the performance status of ACTS in this tracking environment, including comparisons of different track fitting algorithms provided, as well as results linked to the usage of Machine Learning techniques for seed finding and tracking in dense materials.

Consider for young scientist forum (Student or postdoc speaker)

Yes

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