Contribution ID: **84**   Type: **not specified**

Applications of machine learning to the identification of particle etch pits in Moedal NTD (Nuclear Track Detector) Images.

Wednesday 10 April 2019 11:45 (15 minutes)

The Moedal Experiment uses Passive Nuclear Track Detectors (NTDs) to look for magnetic monopoles, and other heavily ionising exotic particles at the LHC. Through a process of chemical etching, the latent ionisation tracks of particles can be converted into microscopically visible known as etch-pits.

This study looks at CNN image recognition for identifying particle etch pits in an NTD foil that has been exposed to both a calibration signal (Heavy Ion Beam), and LHC background exposure.

Image data is collected with Directed-bright-field illumination, at multiple off-axis illumination angles, using a Fresnel lens. This allows the 3-d structure of the etch pits to be inferred. breaking the two dimensional visual symmetry between certain classes of object, while allowing many pits to be imaged simultaneously in the same focal plane.

Classic kernel filter methods are used in this 3d-feature space to pre-select objects of interest, which are then after labeling used to train a CNN classifier.

Presenter: MILLWARD, Lewis Richard (University of London (GB))

Session Classification: Parallel stream 2