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## ATLAS pixel cluster splitting using Mixture Density Network

The high energy and luminosity of the LHC allows to study jets and hadronically decaying tau leptons at extreme energies with the ATLAS tracking detector. These topologies lead to charged particles with an angular separation smaller than the size of the ATLAS Inner Detector sensitive elements and consequently to a reduced track reconstruction efficiency. In order to regain part of the track reconstruction efficiency loss, a neural network (NN) based approach was adopted in the ATLAS pixel detector in 2011 for estimating particle hit multiplicity, hit positions and associated uncertainties. Currently used algorithms in ATLAS will be briefly summarized. An alternative algorithm based on Mixture Density Network (MDN) is currently being studied and the initial performance is promising. As MDN can provide an estimate of position and uncertainty at the same time, the execution can be faster compared to current ATLAS NNs. An overview of MDN algorithm and its performance will be highlighted in the poster. At the same time a comparison will be made with the currently used NNs in ATLAS tracking.

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