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Splitting Strip Detector Clusters in Dense Environments

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Tracking in high density environments, particularly in high energy jets, plays an important role in many physics analyses at the LHC. In such environments, there is significant degradation of track reconstruction performance. Between runs 1 and 2, ATLAS implemented an algorithm that splits pixel clusters originating from multiple charged particles, using charge information, resulting in the recovery of much of the lost efficiency. However, no attempt was made in prior work to split merged clusters in the Semi Conductor Tracker (SCT), which does not measure charge information. In spite of the lack of charge information in SCT, a cluster-splitting algorithm has been developed in this work. It is based primarily on the difference between the observed cluster width and the expected cluster width, which is derived from track incidence angle. The performance of this algorithm is found to be competitive with the existing pixel cluster splitting based on track information.

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