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Track finding in silicon trackers with a small number of layers

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We present software based on novel techniques, developed for track finding in silicon trackers with a small number of layers. The core algorithm is a cellular automaton, followed by a Kalman filter and Hopfield neural network. We present results from two test cases. The first one is the Forward Tracking Detector (FTD) of the International Large Detector (ILD) at a future linear collider, which covers the forward and the backward region between the beam tube and the TPC. It consists of 7 disk-shaped silicon detectors on either side - two with pixel sensors and five with double-sided silicon strip sensors. We give some details on the implementation in the ILD software framework, and present results on simulated events without and with background. These show that our method performs better than the previously used one in terms of efficiency, ghost rate and processing speed.
The second test case is the Silicon Vertex Detector (SVD) of the Belle II experiment at the B factory at KEK, which is a new device between the vertex detector and the central drift chamber. It consists of only four cylindrical layers of double-sided silicon strip sensors. The focus of this study is on the reconstruction of very low momentum tracks that miss the surrounding drift chamber. We present results from simulated data, including ghost hits and hits from the machine background.

quote your primary experiment

ILD, Belle II

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