



Contribution ID: 306

Type: oral presentation

Cellular Automaton based Track Finding for the Central Drift Chamber of Belle II

Monday, April 13, 2015 3:30 PM (15 minutes)

With the upgraded electron-positron-collider facility, SuperKEKB and Belle II, the Japanese high energy research center KEK strives to exceed its own world record luminosity by a factor of 40.

To provide a solid base for the event reconstruction within the central drift chamber in the enhanced luminosity setup, a powerful track finding algorithm coping with the higher beam induced backgrounds is developed at DESY.

Pursing a bottom-up approach, which is less susceptible to the increased number of background hits compared to global event reconstruction techniques such as the Hough transformation and its successors, we present a generalization of the cellular automaton.

While maintaining the high execution speed by circumventing the combinatorial backtracking in the graph of local hit information and extrapolations naturally arising in bottom-up approaches, this so called weighted cellular automaton integrates the adaptiveness of the Hopfield network into the original algorithm.

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Session Classification: Track 2 Session

Track Classification: Track2: Offline software