

Track Finding for the PANDA Detector Based on Hough Transformations

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The PANDA experiment at FAIR (Facility for Antiproton and Ion Research) in Darmstadt is currently under construction. In order to reduce the amount of data collected during operation, it is essential to find all true tracks and to be able to distinguish them from false tracks. Part of the preparation for the experiment is therefore the development of a fast online track finder. This work presents an online track finding algorithm based on Hough transformations, which is comparable in quality and performance to the currently best offline track finder in PANDA. In contrast to most track finders the algorithm can handle the challenge of extended hits delivered by PANDA's central Straw Tube Tracker and thus benefit from its precise spatial resolution. Furthermore, optimization methods are presented that improved the ghost ratio as well as the speed of the algorithm by 70 %. Due to further development potential in terms of displaced vertex finding and speed optimization on GPUs, this algorithm promises to exceed the quality and speed of other track finders developed for PANDA.

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