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Track reconstruction with PANDA at FAIR

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The upcoming PANDA experiment is one of the major pillars of the future FAIR accelerator facility in Darmstadt, Germany. With its multipurpose detector and an antiproton beam with a momentum of up to 15 GeV/c, PANDA will be able to test QCD in the intermediate energy regime and shed light on important questions such as: Why is there a matter-antimatter asymmetry in the Universe?

Achieving its physics goals requires PANDA to perform exclusive measurements of the many desired reaction channels as well as being on the intensity and precision frontiers. The foreseen average event rate will be as high as 20 MHz. At the same time, due to the similarity of signal and background processes, the experiment will need to employ a purely software-based event selection. To facilitate this, tracks and events have to be fully reconstructed in real time, using the available information from all detector components. These conditions prove to be very challenging for the established reconstruction algorithms, and substantial adaptations are mandatory. Fully utilising modern, heterogeneous computing environments, including CPUs, GPUs, and FPGAs will be essential.

This presentation will focus on methods that are developed for PANDA's Straw Tube Tracker. These include an adaptation of a cellular automaton to operate on free-streaming data, as well as an algorithm for longitudinal momentum reconstruction with inclined straw tubes.

Consider for promotion

No

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