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Triplet Based Online Track Finding in the PANDA-STT

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The PANDA-Experiment at the future FAIR facility in Darmstadt will implement a Micro-Vertex-Detector (MVD) and a large-volume Straw Tube Tracker (STT) around the target interaction region together with a set of GEM disks for the charged particle tracking within a 2 T solenoidal magnetic field.
The STT is a gas based detector which is comprised of 4636 cylindrical drift chambers (straw tubes) of 1 cm diameter and 150 cm length, filling an almost cylindrical volume from 16 cm up to a radius of 42 cm around the MVD.

At PANDA a continuous readout mode of the detectors is required due to the broad range of different event topologies and the very high interaction rate of $2*10^7$ annihilations per second.
Due to the similar topology of the interesting physics events and the hadronic background, PANDA will use an online event filter to distinguish signal events from background. In contrast to a traditional trigger system, the online event filter will use high level information such as particle identification, momentum and invariant mass information to identify the physics events.
Tracking information is a prerequisite for all of these, therefore we attempt to reconstruct all tracks in a continuous online tracking scheme. The interplay of different tracking algorithms is required for an optimized reconstruction of the multitude of possible event topologies.

One method of track finding is based on the identification of hit triplets within a certain time window. It is then particularly simple to analytically calculate the circle parameters of the track helix' projection into the xy-plane.
We will present the triplet method in detail as well as studies on its applicability under the PANDA operating conditions.

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