

A FPGA helix tracking algorithm for PANDA

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An online track finder for the PANDA experiment at the future FAIR facility was developed and tested.

The central Panda tracking detectors for charged particles will consist of a silicon based micro vertex detector (MVD, 5-7 hits/track) and possibly of a straw tube tracker (STT, 15 double layers of straws). Due to the solenoidal magnetic field, tracks of charged particles can be parametrized by a helix (if neglecting energy loss).

The algorithm works in several steps. Perpendicular to the beam direction the projection of the tracks is equivalent to a circle. Thus, first a conformal transformation will be used to convert the circles to straight lines. Second, a Hough transform is used to find the straight lines by a peak finding algorithm. Along the beam direction, a different Hough transformation is used. A peak finder returns all needed parameters to describe the helix track.

As the algorithm was developed for an FPGA, it uses lookup tables. Results with simulations will be presented. Possible FPGA implementation will be discussed.

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