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The Pattern Recognition software for the PANDA experiment

PANDA is an antiproton-proton experiment that will run at center-of-mass energies from 2.25 to 5.46 GeV at the new facility FAIR in Darmstadt, Germany. In order to achieve the broad range of physics goals of PANDA, a triggerless data acquisition and a high luminosity (20 MHz interaction rate) are necessary. This talk will concentrate on the Pattern Recognition software of the experiment. This software will use the information of all tracking devices in PANDA, namely a microvertex detector (10 ns signal time resolution), straw tube subdetectors (170 ns signal collection time), a GEM detector (few tens of ns time resolution), a fast scintillator tile system (100 ps time resolution), and several planes of gas proportional drift chambers. The absence of a hardware trigger, on one hand, gives maximum flexibility in the selection of events of interest, and on the other hand, poses severe requirements to the pattern recognition code:

- 1- it has to be very fast to keep up with the 20 MHz interaction rate;
- 2- it must be very efficient in finding tracks and very selective in rejecting ghost tracks caused by the large signal collection time of the straw systems combined with the 20 MHz interaction rate makes possible the (wrong) assignment of a hit to several physics events.

In this talk the ideas and the various algorithms explored in the Pattern Recognition to tackle those challenges will be shown.

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