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DyTER: A framework for Dynamic Track and Event Reconstruction for PANDA at FAIR

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The upcoming next-generation antiproton experiment PANDA at FAIR in Darmstadt, Germany will be an accelerator-based experiment where the data selection relies entirely on a software filter. This paradigm shift is driven by the likeness of signal and background as well as the multitude of investigated physics channels, requiring full and precise information from all detectors in order to perform a reliable data selection.
Such a scheme will also be adopted by other cutting-edge experiments in the future. The software trigger in our experiment will need to cope with incoming event rates of up to 20 MHz, corresponding to a raw data rate of up to 200 GB/s.

Of particular interest for Uppsala are hyperon reactions. Hyperons are baryons, in which one or several of the light quarks have been replaced with heavier ones. Due to their relatively long-lived nature, their decay vertices can be separated from the beam-target interaction point by up to several metres. This poses a particular challenge for the track and event reconstruction. In order to filter interesting data, Uppsala is, in collaboration with other international groups, developing a framework for Dynamic Track and Event Reconstruction (DyTER). DyTER draws upon a variety of reconstruction algorithms, such as a cellular automaton and pattern matching. This presentation will give an overview of the general concept as well as showcase the current development.

Primary author: Mr PAPENBROCK, Michael (Uppsala University)

Presenter: Mr PAPENBROCK, Michael (Uppsala University)

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