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Online reconstruction of a TPC as part of the continuous sampling DAQ of the PANDA experiment.

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PANDA is a universal detector system, which is being designed in the scope of the FAIR-Project at Darmstadt, Germany and is dedicated to high precision measurements of hadronic systems in the charm quark mass region. At the HESR storage ring a beam of antiprotons will interact with internal targets to achieve the desired luminosity of 2x10ˆ32cmˆ-2sˆ-1. The experiment is designed for event rates of up to 2x10ˆ7sˆ-1. To cope with such high rates a new concept of data acquisition will be employed: the triggerless continuous sampling DAQ. Currently it is being investigated if a time projection chamber (TPC) will fulfill the requirements of the central tracking device and consequently what role it will have in the final design of the detector. The proposed TPC would have an expected raw data rate of up to 400 GB/s. Extensive online data processing is needed for data reduction and flexible online event selection. Our goal is to reach a compression factor of the raw data rate of at least 10 by exploiting the known data topology through feature extraction algorithms such as tracklet reconstruction or hit train compression. The full reconstruction of events on the fly is a key technology for the operation of a TPC in continous mode. This talk describes the conceptual design of the online reconstruction for this detector. Results of prototype algorithms and simulations will be shown.

Primary author: Mr NEUBERT, Sebastian (Technical University Munich)

Co-authors: Dr KETZER, Bernhard (Technical University Munich); Mr KONOROV, Igor (Technical University Munich); Dr SCHMITT, Lars (Technical University Munich); Mr WEITZEL, Quirin (Technical University Munich); Prof. PAUL, Stephan (Technical University Munich)

Presenter: Mr NEUBERT, Sebastian (Technical University Munich)

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