

Minutes of the Tracking Session on November 7th, 2018

Presentations were given by Narendra Rathod (Jagiellonian University Krakow), Peter Wintz (Forschungszentrum Jülich) and Tassos Belias (GSI Darmstadt). Topics were the ASIC/TRB3 readout for the STT/FT and the LHCb Outer Tracker modules as an option for the PANDA phase-1 setup. Slides can be downloaded from the tracking session indico page (<https://indico.gsi.de/event/7846/>).

At first, Narendra presented a new method to align the baselines of individual channels in the PASTTREC ASIC by their noise levels at lowest threshold. The procedure can be automated and allows to tune the baseline setting of many ASICs at the same time. The quality was checked after the tune by a measurement of the time-over-threshold (ToT) of ⁵⁵Fe source signals. The obtained ToT spread of individual channels after the baseline tuning was 2.5 ns (RMS), with 173 ns for the ToT mean of 32 channels per FE-board. The method, developed by the Krakow group, is named “NASA” for Noise Accurate Baseline Alignment and will simplify and shorten the set up procedure of the PASTTREC readout systems with many thousand channels in future.

Peter presented the methods and summarized the results for spatial resolution and PID obtained from the various testbeam data. The data was taken in 2016 and 2018 at COSY with a straw test setup and connected PASTTREC-ASIC/TRB3 readout. The proton and deuteron testbeams covered a large dE/dx range of about 5-50 keV/cm, which is relevant for the PANDA-STT. A spatial isochrone resolution of 100-120 micron over the dE/dx range was achieved, which is remarkably better than the design goal of 150 micron. For a determination of the PID capabilities by the time-over-threshold method, the ToT separation of different proton and deuteron momenta were determined, relative to 2.5 GeV/c protons which are minimum ionizing. A separation power in a range from about 4 to 13 was obtained in the proton momentum region of about 0.8 to 0.3 GeV/c. More details about the analysis and methods can be found in the slides.

Tassos gave an overview about the LHCb Outer Tracker Modules (OTR), which are in discussion to be used in the PANDA phase-1 experiment as part of the forward tracking spectrometer. He presented the OTR specifications and first ideas about possible layout and location at PANDA. A main difference to the PANDA straws is the smaller OTR straw diameter of 5 mm. Discussions about how to adapt the OTR readout (ASDBLR- FE) to the TRB3 readout have already started at GSI with M. Traxler. Questions arose concerning the consequences of the higher material budget (2% radiation length per module), the number of required additional electronic readout channels (~ 12000) and that more information about supply systems, for instance gas system is needed.