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Implementation of ACTS-based track reconstruction for the forward detector in the MPD experiment at NICA

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Multi-Purpose Detector (MPD) is aimed at the extensive investigation of the properties of dense QCD matter created in heavy ion collisions. The forward tracking detector would extend available rapidity range from $|y| < 1.2$ to $|y| < 2.5$, which is critical for the studies of various observables that can be used to probe the properties of the produced matter. The main challenges for the detector are the momentum resolution limited by the radial distance available for the track curvature measurement that is strongly reduced at high pseudorapidities, large material budget in front of the detector and high occupancy expected in central heavy ion collisions.

ACTS (A Common Tracking Software) is extensively used for the forward detector design developments. It provides a set of experiment-independent tools for particle track reconstruction, implemented with modern software concepts. The set includes the Kalman filter for track fitting, seeding tools and combinatorial Kalman filter for track finding. Coupled with an independent geometry description, these algorithms can be adapted to various detector types.

Performance of ACTS-based implementation of track reconstruction was tested both in simplified and realistic environments in terms of event multiplicity. In this report, we will discuss the results of the forward tracker performance studies.

Authors: KRYSHEN, Evgeny (JINR, PNPI); BURMASOV, Nazar (JINR, PNPI)

Presenter: BURMASOV, Nazar (JINR, PNPI)

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