

Gas detectors for particle identification at the MPD experiment.

The MultiPurpose Detector (MPD) which will be located at the NICA accelerator is designed for the study of properties of hot and dense matter created in heavy-ion collisions, in particular, for the search of the mixed quark-hadron phase.

Particle identification (PID) of charged hadrons is achieved by the time-of-flight (TOF) measurements which are complemented by information about energy loss (dE/dx) from the TPC and IT detector systems. In order to separate pions from kaons in the momentum range 0-2.5 GeV/c and protons from kaons in the range 0-4.5 GeV/c, TOF has to have time resolution better than 100 ps. The barrel TOF system have a length of 5 m and radius of 1.2 m. As a base element of the TOF detector we consider a 10 gap mRPC with a strip(pad) readout. A large time projection chamber (TPC) is the main tracking device of the MPD spectrometer. TPC is 3m long and 2.2 m in diameter. The active gas volume of the TPC is bounded by coaxial field cage cylinders with instrumented pad-plane end-caps at both ends. The TPC will register spatial coordinates of 50 points for each track traversing the field cages. Magnetic field of 0.5 T strength will provide the required resolution for charged particles of 0.1-3 GeV/c momentum. Using the information about ionization loss from TPC makes possible to improve the efficiency of π/K separation.

I will review the status of the MPD detectors development with particular emphasis on the mRPC and MWPC performance for PID.

Summary (Additional text describing your work. Can be pasted here or give an URL to a PDF document):

The TPC and TOF systems of the NICA MPD spectrometer will be presented. The developed design of the detectors meets the requirements of the MPD experiment.

Primary author: BABKIN, Vadim (JINR)

Presenter: BABKIN, Vadim (JINR)