

## Online Gas Gain Monitoring System

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Different kinds of gaseous detectors are widely used in present and future experiments. Straw Tube Trackers (STT) and Micro-Pattern Gaseous Detectors (MPGD) are capable for both precise hit charge and coordinate measurements. Flexibility of their operation makes them to be an attractive solution for detector instrumentation in future High Energy and Neutrino Physics experiments.

High quality of gas mixture is necessary for achieving the best detection performance. To monitor the gas mixture quality during gaseous detector operation a Gas Gain Monitor System (GGMS), was developed. The GGMS consists of reference straw tubes with the diameter of 10 mm, readout electronics and a  $^{55}\text{Fe}$  radioactive source. The signal charge produced by  $^{55}\text{Fe}$  X-rays in the reference straws is measured, and changes in the obtained charge distribution correspond to changes in the gas gain. Corrected for dependence on the atmospheric pressure and temperature, the gas gain should remain constant if the working gas mixture quality is stable.

We present first results on the performance of the developed GGMS. A dedicated measurement setup developed at JINR allows to study the STT and MPGD performance with generator test pulses, cosmic ray muons and radioactive sources while monitoring the gas mixture quality.

We present also examples of Garfield simulation of a straw tube response interfaced to the LTSpice electronics simulation package. This approach allows efficient optimization of the signal circuit path and its operation mode, and supports performance studies for GGMS operated with different high voltages and with different gas mixtures.

Future potential applications of GGMS include the Straw Tube Trackers for the Near Detector complex of the DUNE experiment and the central tracker of the SPD experiment at NICA.

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