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Integration of the HGND readout into the B@MN experiment data acquisition system

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The new high granular time-of-flight neutron detector (HGND) is being developed for the BM@N (Baryonic Matter at Nuclotron) experiment to identify neutrons and to measure their energies in heavy-ion collisions at ion beam energies up to 4 AGeV. The HGND consists of about 2000 scintillator detectors (cells) with a size of 40X40X25 mm^3 and with individual light readout with EQR15 11-6060D-S photodetectors. The readout board with a 100 ps FPGA-based TDC (Time to Digital Converter) is currently under development. The HGND will have eight such readout boards, each comprising three Kintex 7 FPGAs for reading out 252 channels. The TDC operates on the standard LVDS 4x asynchronous oversampling and is synchronized with the experiment timestamp using the White Rabbit link. The two-channel TDC prototype demonstrates a time resolution of 42 ps. The FPGA-TDC principle of operation and tests results, readout board topology, and the readout software architecture will be discussed.

Section

Design of new experimental facilities

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