

Heavy ion beam diagnostic of MASHA setup

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Implementation and testing of new beam diagnostics for modernized MASHA setup is presented in this work by using the high-speed digitizers and high-speed digital I/O modules based on PXI and PXIe standards from XIA, Agilent and National Instrument companies. The software system for beam diagnostics written in C/C++ was also developed and implemented. The new system was tested in the experiments on the beam with heavy ions at cyclotron U400M in complete fusion reactions: $40\text{Ar} + 144\text{Sm}$, $40\text{Ar} + 166\text{Er}$. Two independent methods are used for energy measurement of the beam. The first one uses two pick-up detectors (energy resolution $\sim 1\%$), the second one includes two MCP and one silicon detectors (energy resolution $\sim 0.5\%$). Due to the new system all parameters concerning the beam diagnostics (beam energy, beam intensity, isotope identification and so on) are written directly into data word of DAQ, which is very important for reliability of experimental results especially in so rare processes like synthesis of heavy and su-perheavy elements.

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