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NEW BEAM DIAGNOSTIC SYSTEM FOR MASHA SETUP

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New beam diagnostic system, based on PXI standard, was developed, tested and used in the experiment for MASHA setup. The beam energy and beam current measurement is realized using a few different methods. Online time of flight energy measurement was done using three pick-up detectors. The distance between the first pair of detectors was 2 meters and between the second pair of detectors 11 meters. High frequency signal generated between preamplifier and pick up sensors was damp by fine preamplifier adjustments. We used two electronics systems to measure time between pick-ups. First of them is based on the fast Agilent digitizers (2 –channels 4 GHz sampling rate) and the second one on constant fraction discriminator connected to TDC (5 ps resolution). Saving signals and signal processing is possible by using digitizers. In this case we use many mathematical algorithms to determine peak position and Fast Fourier Transformation for frequency signal processing. System was calibrated by comparing signal delay between the first and the second pick up detector. New graphical interface for controlling of electronics devices and online calculating energy was developed in MFC C++. It was also used the second system based on microchannel plate's time of flight detectors and silicon detector for determination of beam energy and type of accelerated particles. Time of flight measurement has 100 ps time resolution and energy difference between each one used system is less than 1.5%.

The beam current measurement is realized by two different sensors. The first one is Rotating Faraday cup before target and second one is emission detector after target. Detectors are connected to 50 uA range power suppliers made in JINR and controlled by LabWiev software developed by our group.

Both systems are synchronized with our data acquisition system. The information on beam energy and beam current is included in data event. This system is now used in the experiments for super heavy elements synthesis on cyclotron U400M in Flerov Laboratory of Nuclear Reactions (FLNR).

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