

DEVELOPMENT OF TIME-OF-FLIGHT SYSTEM FOR AUTOMATIC MEASURING PROJECTILE ENERGY FOR SEPARATOR DGFRS-2 EMPLOYING NI LabVIEW

Barinova S.^{1,2}, Schlattauer L.^{1,3}

¹ *Laboratory of Nuclear Reactions, Joint Institute for Nuclear Research, 6 Joliot-Curie, Dubna, Moscow region, 141980, Russia;* ² *Department of Elementary Particles, Faculty of Physics, Moscow State University, Moscow, Russia;* ³ *Department of Experimental Physics, Faculty of Science, Palacký University, 17. listopadu 1192/12, 771 46 Olomouc, Czech Republic*

E-mail: barinovasoffia@gmail.com

The paper presents ready-to-use software for automatic online measurement of ion beam energy and recording the relevant data in long-term experiments.

Reactions of complete fusion of actinide targets and ions like ^{48}Ca and still heavier ones are to be used in experiments aimed at the production of the new heaviest nuclides in the domain of superheavy elements. The nuclei of interest are produced with reasonable yield in rather narrow range of energy of the bombarding particles. In view of the extremely low production cross sections typical for the nuclei under study, setting up an appropriate energy of beam particles, its accurate measurement and continuous control becomes a crucial part of such experiments.

A time-of-flight technique is to be used in heavy-element research at the DGFRS-II separator in order to determine energy of the ion beams delivered by DC-280 cyclotron of the SHE-Factory at FLNR, JINR. Structurally, the beam of accelerated ions produced by the cyclotron consists of rather narrow bunches of particles that are well separated in time and, accordingly, along their flight path. When traversing the pick-up electrodes such a bunch of charged particle generates a detectable electronic signal. Thus, the energy of beam particles can be determined by measuring their time of flight through a pair of pick-up electrodes mounted at a known distance.

The developed software is an important component of the control systems employed in experiments with the separator DGFRS-II.