Monitoring OF Main Parameters OF Relativistic Particles Beam for Synchrophasotron Experiment DELTA-2

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Abstract

There is described a monitoring system of main parameters of the extracted relativistic particles beams in the GAMMA-2 experiment (Synchrophasotron-Nuclotron accelerators complex).

The aim of GAMMA-2 experiment (cooperation JINR - Marburg - Ulih (Germany)) is to measure of power dependence of an output of secondary neutrons at interaction of beams of protons, deutrons, helium and carbon nuclei with targets from copper, lead and uranium in a energy range from 0.5 up to 7.4 Gev.

These measurements give a fundamental information on structure of heavy nuclei, and data for realization of applied calculations on problems of designing electronuclear subcritical installations for safe reception of energy and problems transformation of long-lived radionuclides to short- lived or stable nuclides radioactive waste of nuclear stations.

One of the requirements to experiment is the achievement results with precision at a level 5-10%. It requires of permanent control of quality of a beam of particles during measurings, which duration achieves several tens hours at particle flux on a target 10 to the 13 power.

The monitoring system includes scintillation detectors for management of beam intensity and stability with a method of a scattering on a thin auxiliary target, activation detectors for estimation of intensity, POLAROID films for definition of a positions and sizes of a beam on a target, and also software for "on-line" displaying data and their records for the further calculations.

The software allows also get current informations about accelerator and its actual states. This is such data as time, value of a magnetic field, duration of accelerator cycles and also complete information on the extracted beams (given on intensity from proportional chambers, position of a beam in different points of channels of transportation).