

NUCLOTRON BEAM DIAGNOSTICS

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The superconducting synchrotron named Nuclotron was put into operation at the Laboratory of High Energies (JINR, Dubna, Russia) in 1993. The beam diagnostics subsystem of the Nuclotron Control System is described in this paper. The diagnostics of the beam injection transport line include 2 wire profilometers, 1 wire beam current monitor, 2 destructive screen monitors and 2 Faraday cups. The beam profile monitor consists of X- and Y-wire planes. Each plane has 32 golden tungsten wires 0.1 mm in diameter separated by 2 mm. The beam current monitor has one plane with wires connected in parallel. Image processing technique based on fluorescent screens, CCD cameras, and frame-grabbers ensures the following possibilities: fluorescent screen selection and setting inside the beam, video tuning, background subtraction, pseudo-color for displays, saving and restoring specific images, snapshot and live mode selection. The accelerator ring diagnostics are composed of 5 wire profilometers, 21 electrostatic position pick-ups, 1 electrostatic intensity pick-up, 1 magnetic pick-up, 4 destructive screen monitors, 4 Faraday cups. Using the position and intensity pick-ups together with fast (20 - 250 MHz) buffered ADCs of 8 bit resolution, beam information for each revolution can be acquired. It is possible to obtain transverse and longitudinal information for 800 first turns in parallel with orbit acquisition.