IONIZATION BEAM PROFILE MONITOR FOR OPERATION UNDER HARD ENVIRONMENTAL CONDITIONS

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The design and the performance of the Ionization Beam Profile Monitor (IBPM) operating on the residual gas ionization principle are described. The main advantage of the constructed device is the non-contact measuring method. Operating under hard environmental conditions it delivers the information about the primary beam position, profile and intensity in "on-line" regime. It was tested under high gamma and neutron radiation conditions and changing vacuum using a range of low and intermediate energy beams at the beam current of a few nA to 15 μA. The diagnostic box was located in the vicinity of the accelerator, where the neutron flux was over 10^6 n/cm^{2}s. It was found out that the device is capable to operate in vacuum in the range of $10^{-6} \div 10^{-3}$ mbar without the loss of the resolution power at the beam current as low as a few nA. The IBPM is prospective for beam profile monitoring due to long time. Emergency situations do not lead to decrease of its operability.

Keywords: ionization beam profile monitor, heavy ion beams, beam profile diagnostic, on-line beam monitoring, the U400M cyclotron of FLNR JINR, hard radiation conditions.