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Transverse profile measurement of beam for 230MeV proton therapy beamline using scanning wires

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A superconducting cyclotron-based proton therapy system has been developed at the China Institute of Atomic Energy (CIAE). For the 230MeV proton therapy cyclotron (CYCIAE-230), the beam profile is crucial for the adaptation of the proton therapy planning system and an important basis for the commissioning of the beam line. CIAE designed the scanning wires device for the proton therapy facility, which is for high-resolution profile measurements. A readout elec-tronics unit with fA resolution has been included to adapt to the small signal of scanning wires. The data process unit uses ZYNQ-7035 together with 24-bit ADCs and transmits measurement results via MOD-BUS TCP protocol. The diagnostic electronics are placed close to the beam profile monitors (BPM) to reduce the analogue signal transmission distance. To adapt to the mode of the pulse beam during the beam-line commissioning, using the RF system signal trigger sampling, to prevent the signal aliasing. Besides that, a Butterworth filter and a mean filter were used to filter measurement noise. The design of this scanning wire diagnostic system will be reviewed in this paper, to-gether with several measurement results.

Footnotes

Funding Agency

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Yes

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