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The design and accurate calibration of HIAF-Ring BPM

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Beam Position Monitors (BPM) are the non-destructive monitors used most frequently at nearly all linacs, cyclotrons, and synchrotrons. The most basic function of BPM is to provide the accurate position of the centre of mass of the beam for closed orbit feedback and other demands. However, due to the error of actual processing, the k value and the actual electric center will be different with the ideal k value and electric center of BPM, which requires us to accurately measure the k value and offset value of each set of BPM offline.

There are 72 sets of BPMs in HIAF BRing & SRing, with 10 specifications and plate radius ranging from 180mm to 330mm, but the shape and size of the front and back pipes connected to bpm are variety during actual installation. Based on theoretical analysis, the k value and offset value of the BPM which electrode plates are too close to the flange are greatly affected by the pipes connected to bpm at both ends, and the measurement error can even reach 9mm. Therefore, this paper takes HIAF BRing and SRing BPM calibration as examples to explain how to accurately calibrate BPM.

Footnotes

Funding Agency

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