Contribution ID: **750** Contribution code: **THU-PO3-117-01** Type: **Poster**

Coupling Design of Focusing Function Bending Magnet and High Current Electron Beam for 100 kW Irradiation Accelerator

Thursday 18 November 2021 10:00 (20 minutes)

RF system is one of the key components of a 2 GeV, 6 MW high power FFAG accelerator being designed at China Institute of Atomic Energy. In order to verify the design principle and the engineering feasibility, a small scaled RF cavity is under construction, which can also be used as the main accelerating cavity for a 100 kW electron irradiation accelerator. By the deflections of several 180 deg bending magnets, the electrons emitted from the electron gun can pass the cavity for multiple times. Due to the limited length of the cavity, the deflection radius should be as small as possible to ensure more acceleration times and consequently higher beam power, which will make the fringe field effect of the bending magnet be a problem. In addition, the bending magnet should provide beam focusing in both the radial and axial directions to compensate the space charge force of the beam and keep the beam envelope stable during the whole acceleration process. Based on the above reasons, the parameters of the combined function bending magnet, such as the edge angle, magnetic field gradient and shielding distance, have a great influence on the beam dynamics behavior in the accelerator, which bring great difficulty to the design of the combined function bending magnet. In this paper, the coupling design of the bending magnet with focusing function and the high intensity electron beam for this 100 kW irradiation accelerator will be illustated in detail.

Primary authors: Mr GUAN, Leilei (China Institute of Atomic Energy); Dr LI, Ming (China Institute of Atomic Energy)

Co-authors: Mr WANG, Fei (China Institute of Atomic Energy); Dr WEI, Sumin (China Institute of Atomic Energy); PEI, Shilun (Institute of High Energy Physics); Prof. AN, Shizhong (China Institute of Atomic Energy); YIN, Zhiguo (China Institute of Atomic Energy); ZHANG, Tianjue (China Institute of Atomic Energy)

Presenter: ZHANG, Tianjue (China Institute of Atomic Energy)

Session Classification: THU-PO3-117 Resistive acclerator magnets II