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Development of Wire Scanner Profile Monitor in FETS-FFA Test Ring

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Wire Scanner profile Monitor (WSM) has been developed for the demonstration ring of Fixed Field Alternating gradient (FFA) accelerator, called FETS-FFA. From previous studies, Carbon Nano Tube (CNT) wire is selected for the FETS-FFA WSM, durable for the heat damage of low energy proton beams on FETS-FFA test ring (3-12 MeV). The bias voltages are required to prevent secondary electrons returning to the wire due to stray magnetic fields of FFA main magnets. The endurance tests of bias voltages on different size of CNTs were performed prior to the beam tests on the the Front-End Test-Stand (FETS) beam line. The beam tests with bias voltages and numerical simulations revealed secondary electrons from adjacent wires degraded the reading sensitivity hence profile accuracy, explaining the peak of beam profile was not proportional to the wire size in previous studies. This paper will focus on the endurance test of bias voltages on CNTs as well as beam profile measurements with bias voltages on FETS beam line. The mechanical design of automation zig to install a thin CNT wire (diameter of 10 μm) on the frame head of FETS-FFA WSM will be also presented.

Footnotes

Funding Agency

I have read and accept the Conference Policies

Yes

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