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Development of CT monitor to measure the stacking beam in the FETS-FFA test ring

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The FETS-FFA will be a proof-of-principle Fixed Field Alternating gradient accelerator (FFA), to demonstrate the feasibility of these machines to drive megawatt-class spallation neutron sources, such as the proposed ISIS-II. It will accelerate protons from 3 to 12 MeV, and demonstrate high-intensity operation through large space charge tune shift. Beam stacking takes advantage of the static magnetic fields and large momentum acceptance of an FFA, to overcome space-charge intensity limitations by combining beams at their highest energy. Four coasting beams are expected to be stacked over 80 ms, which demands an intensity monitor sensitive to coasting beams over this time. Conventional DC Current Transformer's (DCCT's) have proven difficult to develop for a large aperture, so a single inductive core equipped with a Negative Impedance Converter (NIC) amplifier is being developed to provide a time constant of 1 second. This paper will present a feasibility study of this Current Transformer(CT), as well as bench measurements with a large-aperture FT3M FINEMET core and prototype NIC.

Footnotes

Paper preparation format

LaTeX

Region represented

Europe

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