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Development of Current Monitor for Stacking Beam in FETS-FFA Test Ring

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Design studies of the FETS-FFA demonstration ring have been conducted as part of the ISIS-II proposal for a new high-power spallation neutron source. Beam stacking has been proposed to overcome space-charge limits in an FFA, and the feasibility of this will be evaluated in the FETS-FFA test ring by stacking up to four pulses at 50 Hz. To monitor the long-pulsed current of the coasting stacked beams over around 80 ms, the demonstration monitor of large-aperture Current Transformer (CT) with a Negative Impedance Converter (NIC) amplifier is being developed. NIC amplifier compensates the decay constant of the CT signal by cancelling the resistance of the wound coil. In addition to measuring long-pulsed coasting beam currents, the feedforward system is also added in NIC amplifier to boost the frequency band up to a few MHz to enable to measure accelerating bunch currents. In this paper, the design study of CT monitor with NIC amplifier as well as feasibility tests of demonstration monitor will be presented by detecting a long-pulsed signal (1s) and a short-pulsed signal (a few hundreds of ns).

Footnotes

Funding Agency

I have read and accept the Conference Policies

Yes

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