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Beam Bunch Spacing Extension for Neutron Time-of-Flight Measurements at the LEAF

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Longer bunch spacing is essential for precise product detection in certain nuclear physics experiments. At LEAF, a 10.156 MHz pre-buncher has been successfully commissioned, producing a 98.4 ns main-bunch spacing with a measured FWHM of 1.7 ns using a fast Faraday cup. Residual satellite bunches at the 12.3 ns linac micro-pulse period necessitate a dedicated RF deflector to remove unwanted time components. Simulation results demonstrate that the designed RF deflector achieves nearly 100 % chopping efficiency while maintaining a 1.91 ns FWHM and 0.57 % energy spread, delivering a clean 100 ns beam structure. This enables suppression of pile-up and spectral overlap, thereby improving the time-of-flight resolution at LEAF.

Footnotes

Funding Agency

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Yes

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