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Beam dynamics simulation of dual harmonic RF system for the Proton Storage Ring at LANSCE

Tuesday 3 June 2025 16:00 (2 hours)

We evaluate several key performance metrics of the Proton Storage Ring (PSR) at the Los Alamos Neutron Science Center (LANSCE) for a potential upgrade from a single harmonic to a dual harmonic RF system. The instability caused by space charge effect is a common limitation for high-intensity proton ring, like the PSR, an accumulation ring for 800 MeV protons. While an upgrade to the present RF system strained by obsolete components is under consideration for the LANSCE Modernization Project (LAMP), a case still needs to be made for a dual harmonic RF system to mitigate the space charge effect. In this work, results of beam dynamics simulation using PyORBIT are presented with a focus on beam instabilities caused by space charge effect and its relationship with beam currents, bunching factors, beam losses, and the percentage of beam in the gap for extraction losses.

Footnotes

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