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Simulation Modeling of First-Turn Losses for the LANSCE Proton Storage Ring (PSR)

Tuesday 12 August 2025 12:10 (20 minutes)

The LANSCE proton storage ring (PSR) accumulates 795 MeV protons into a short, 290 ns pulse over 625 μs, or about 1745 turns. One of the primary limitations for maximum proton pulse intensity is beam loss between the H^- stripper foil and the first dipole magnet downstream of the foil. One of the major beam losses in this region, referred to as "first-turn losses,"are due to incomplete stripping of the injected H^- beam into H^+ during the injection process. First-turn losses not only result in a lower extracted proton pulse intensity but can also result in longer maintenance periods following beam runs due to the activation of PSR components, which require "cooling down"prior to any hands-on maintenance. In this work, a detailed particle-tracking model of the PSR injection system was created using the simulation package General Particle Tracer (GPT) using three C++ custom elements created to simulate foil scattering, foil stripping, and Lorentz stripping. The model was used to study the effect of different stripper foil parameters and different injection offsets on first-turn losses and emittance growth. The simulation model will be described, and the simulation results will be presented at the conference.

Please consider my poster for contributed oral presentation

No

Would you like to submit this poster in student poster session on Sunday (August 10th)

No

Footnotes

Funding Agency

I have read and accept the Privacy Policy Statement

Yes

Author: YOSKOWITZ, Joshua (Los Alamos National Laboratory)

Co-authors: ALEXANDER, Anna (Los Alamos National Laboratory); TAYLOR, Charles (Los Alamos National Laboratory); HUANG, En-Chuan (Los Alamos National Laboratory); HENESTROZA, Enrique (Los Alamos National Laboratory); XU, Haoran (Los Alamos National Laboratory); Dr LEWELLEN, John (Los Alamos National Laboratory)

Presenter: YOSKOWITZ, Joshua (Los Alamos National Laboratory)

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