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Interactions between the circulating beam and the injection foil at the Proton Storage Ring of LANSCE

Tuesday 12 August 2025 16:00 (2 hours)

At the Los Alamos Neutron Science Center (LANSCE), the injection system of the Proton Storage Ring (PSR) utilizes charge exchange via a stripping foil to convert H^- ions into H^+. While beam losses caused by partially stripped neutral hydrogen atoms are a primary concern, interactions between the circulating beam and the injection foil also play a significant role in overall beam loss. Each stored proton interacts with the foil 30 times on average. As a result, large-angle scattering is a dominant cause of beam losses in beam dynamics simulations.

To mitigate these effects, a set of bump magnets is employed to gradually move the closed orbit away from the foil during the accumulation process. In this work, we first compare various foil scattering algorithms used in ring simulations against results from Monte Carlo (MC) codes. We then quantify the impacts of different bumping schemes, assess uncertainties related to injection offsets, generate interaction 2d-distribution on the foil for heat load simulations, and evaluate the effects of different injected beam distributions.

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

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