

# Low energy multi-beam dynamics in novel LANSCE front end

*Monday 26 August 2024 16:00 (2 hours)*

The proposed novel 100 MeV injector for the LANSCE Accelerator Facility\* is designed to replace the existing 750-keV Cockcroft-Walton-columns-based injector. The new Front End includes two independent low-energy transports for H<sup>+</sup> and H<sup>-</sup> beams merging at the entrance of a single RFQ, with the subsequent acceleration of particles in the new Drift Tube Linac. The challenge of the design is associated with the necessity of simultaneous acceleration of protons and H<sup>-</sup> ions with different beam currents, beam charges per bunch, beam emittances, and space charge depression, in a single RFQ and DTL, while injection beam energy is reduced from 750 keV to 100 keV. Acceleration of various beams in a single RFQ provides less flexibility for optimal adjustment of acceleration and focusing parameters concerning the existing LANSCE setup. The paper discusses details of self-consistent multi-beam dynamics in the proposed injector.

## Footnotes

\*Y. K. Batygin et al., "Advancement of LANSCE Front End Accelerator Facility", in Proc. IPAC'21, Campinas, Brazil, May 2021, p.1894 (2021).

## Funding Agency

The research presented in this paper was supported by the Laboratory Directed Research and Development program of Los Alamos National Laboratory under project number 20240177ER.

**Primary author:** BATYGIN, Yuri (Los Alamos National Laboratory)

**Presenter:** BATYGIN, Yuri (Los Alamos National Laboratory)

**Session Classification:** Monday Poster Session

**Track Classification:** MC3: Proton and Ion Accelerators and Applications: MC3.2 Ion linac projects