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Simultaneous acceleration of multiple beams in novel LANSCE front end

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We present the 100 MeV injector design for the LANSCE Accelerator Facility, which is designed to replace the existing 750-keV Cockcroft-Walton-columns-based injector. This new Front End includes two independent low-energy transports for H⁺ and H⁻ beams merging at the entrance of a single RFQ, with the subsequent acceleration of particles in the new Drift Tube Linac. The challenge of this design is associated with the necessity of simultaneous acceleration of protons and H⁻ ions with multiple beam flavors in a single RFQ and DTL. The LANSCE operation regime provides simultaneous delivery of beams to five experimental areas, with a forecasted increase in the number of targets in the future. Each beam is characterized by a unique time structure, pulse length, emittance, and charge per bunch. The paper presents the details of this design and injector parameters.

Footnotes

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

Presenter: BATYGIN, Yuri (Los Alamos National Laboratory)

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