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Design of the Beam Transport Optics of TRIUMF's New 300 keV H⁻ Ion Source

The ion source and injection system beamline is used to transport the 300 keV H⁻ beam from the ion source to the injection point of the 500 MeV cyclotron at TRIUMF. A new ion beam transport system has been designed to transport a highly intense and bright beam extracted from the H⁻ ion source. This new system will be installed at the new injection terminal for TRIUMF's 500 MeV cyclotron. The low energy part of the transport section (25 keV) in the injection terminal has been designed with magnetic optical elements in order to maintain space-charge neutralization. The injection terminal includes a permanent magnet solenoid lens, magnetic steerers, a pulser, a beam dump, and a 300 kV accelerator column with electron and positive ion suppressor rings. Beam optics calculations have been performed, including space-charge effects up to 1 mA. The simulation results of the beam optics design and the initial beam emittance measurements for the prototype beam transport system will be presented.

Funding Agency

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Yes

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