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A Low Energy Beam Transport to Match a Multicusp Ion Source to RFQ

The RadioFrequency Quadrupole Direct Injection Project (RFQ-DIP) uses a filament-driven multicusp ion source to produce H^{2+} . A Low Energy Beam Transport (LEBT) injects the beam from the ion source into the RFQ. The LEBT shapes the beam to the optimum input Twiss parameters for transmission through the RFQ while minimizing the emittance. The LEBT system has been designed using the accelerator codes IBSimu and WARP. To ensure the accuracy of the simulations, a series of diagnostic tools to assess the beam quality have been integrated into the LEBT design. The LEBT also integrates a beam chopper for machine protection and duty factor control, as well as steering capability to compensate for small misalignments. Presented here are the beam dynamics simulations as well as the design of the LEBT and matching to the RFQ.

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