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## Recent Work

### Title

A multi-beamlet injector for heavy ion fusion: Experiments and modeling

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## A Multi-beamlet Injector for Heavy Ion Fusion: Experiments and Modeling

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To provide a compact high-brightness heavy-ion beam source for Heavy Ion Fusion, we have performed experiments to study a proposed merging beamlet approach for the injector. We used an RF plasma source to produce the initial beamlets. An extraction current density of 100 mA/cm<sup>2</sup> was achieved, and the thermal temperature of the ions was below 1 eV. An array of converging beamlets was used to produce a beam with the envelope radius, convergence, and ellipticity matched to an electrostatic quadrupole channel. Experimental results were in good quantitative agreement with simulation and have demonstrated the feasibility of this concept. The size of a driver-scale injector system using this approach will be several times smaller than one designed using traditional single large-aperture beams. The success of this experiment has possible significant economical and technical impacts on the architecture of HIF drivers.