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Multiple beam induction linacs

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For heavy-ion driven inertial fusion energy, induction accelerators are appealing because of their higher efficiency and of the demonstrated capability to accelerate high beam current (10 kA in some applications). Accomplishments and challenges are summarized. HIF R&D has demonstrated the production of single ion beams with the required emittance, current, and energy, suitable for injection into an induction linac. Driver scale beams have been transported in quadrupole channels over short distances. None of the experiments to date have demonstrated transport and acceleration of multiple, parallel driver scale beams at the required repetition rate. Finally, we describe near-term research objectives to justify and to reduce the risks associated with heavy ion drivers based on induction accelerators. This research would be essential to justify a heavy-ion research facility capable of heating matter to fusion relevant temperatures and densities, and also to test and demonstrate an accelerator architecture that scales well to a fusion power plant.

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