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OPTIONS FOR AN INTEGRATED BEAM EXPERIMENT*

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The Heavy Ion Fusion Virtual National Laboratory (HIF-VNL), a collaboration among LBNL, LLNL, and PPPL, is presently focused on separate smaller-scale scientific experiments addressing key issues of future Inertial Fusion Energy (IFE) or High Energy Density Physics (HEDP) drivers: the injection, transport and focusing of intense heavy ion beams at currents from 25 mA to 1 MA.

As a next major step in the HIF-VNL program, we aim for a complete “source-to-target” experiment, the Integrated Beam Experiment (IBX). By combining the experiences gained in the current separate beam experiments, IBX would allow the integrated scientific study of the evolution of a high current (~1 MA) single heavy ion beam through all sections of a possible heavy ion fusion driver: the injection, acceleration, compression, and beam focusing.

This paper describes the main parameter and technology choices of the proposed IBX experiment. Present designs call for a K^+ beam accelerated in an induction linac to 5-10 MeV. Different accelerator cell options are described in detail. In addition, recent innovative IBX design alternatives are introduced, which would allow ion-driven energy deposition into targets for HEDP studies.

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