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Predictive Fully Kinetic Modeling of kJ and MJ Dense Plasma Focus Z-Pinches[1] A. LINK, J. ELLSWORTH, S. FALABELLA, H. MCLEAN, B. RUSNAK, A. SCHMIDT, J. SEARS, V. TANG, Lawrence Livermore National Laboratory, D. WELCH, Voss Scientific — Dense plasma focus (DPF) Z-pinches are compact devices capable of producing MeV ion beams, x-rays, and (for D or DT gas fill) neutrons but the details of the mechanisms which give rise to these strong accelerating gradients are not well understood. We report on progress in developing predictive, fully kinetic simulations of DPF Z-Pinches using the particle-in-cell code LSP. These simulations include full-scale electrodes; both run-in and pinch phases; and post-pinch behavior. Here we present a comparison between simulations and experiments conducted on the LLNL 4 kJ tabletop DPF. Diagnostics allow us to measure neutron yield, plasma oscillations arising from instabilities, DPF ion beam energies, and the acceleration of an externally injected ion probe beam in the pinch region, which can be compared with simulations. We will further report on the initial work to extend these simulations from kJ to MJ-class devices. LLNL-ABS-640759

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