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Theoretical studies of defect formation and target heating by intense pulsed ion beams J.J. BARNARD, LLNL, T. SCHENKEL, A. PERSAUD, P.A. SEIDL, LBNL, A. FRIEDMAN, D.P. GROTE, LLNL, R.C. DAVIDSON, E.P. GILSON, I. KAGANOVICH, PPPL — We present results of three studies related to experiments on NDCX-II, the Neutralized Drift Compression Experiment, a short-pulse ($\sim$ 1ns), high-current ($\sim$ 70A) linear accelerator for 1.2 MeV ions at LBNL. These include: (a) Coupled transverse and longitudinal envelope calculations of the final non-neutral ion beam transport, followed by neutralized drift and final focus, for a number of focus and drift lengths and with a series of ion species (Z=1-19). Predicted target fluences were obtained and target temperatures in the 1 eV range estimated. (b) HYDRA simulations of the target response for Li and He ions and for Al and Au targets at various ion fluences (up to 10^{12} ions/pulse/mm^2) and pulse durations, benchmarking temperature estimates from the envelope calculations. (c) Crystal-Trim simulations of ion channeling through single-crystal lattices, with comparisons to ion transmission data as a function of orientation angle of the crystal foil and for different ion intensities and ion species.

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