Abstract Submitted
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Implications of different stopping power models on target heating simulations using HYDRA[1] SETH VEITZER, PETER STOLTZ, Tech-X Corporation, JOHN BARNARD, LLNL, ENRIQUE HENESTROZA, LBNL, GARY KERBEL, MARTY MARINAK, LLNL — Accurate numerical simulations of ion driven Warm Dense Matter experiments requires accurate models of stopping powers for targets with temperatures up to a few eV. For finite temperature targets, energy loss of beam ions is comprised of contributions from nuclear stopping, bound electron stopping, and free electron stopping. We compare two different stopping power algorithms and the implications on target heating for two different beams corresponding to the current Neutralized Drift Compression Experiment (NDCX) and proposed NDCX II experiments. The NDCX I beam has a beam energy much lower than the Bragg peak while the NDCX II beam is designed to enter the target just above the Bragg peak, and exit just below. The first stopping power algorithm is based on the classical Bethe-Bloch formulation as is currently implemented in the HYDRA simulation code. The second algorithm is based on rescaling of experimental protonic stopping powers as developed by Brandt and Kitagawa for nuclear and bound electronic stopping, and free electron stopping following the model developed by Peter and Meyer-ter-Vehn.

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