Abstract Submitted
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High dose-rate irradiation of materials with pulsed ion beams at NDCX-II[1] PETER SEIDL, Lawrence Berkeley Natl Lab, F. TREFFERT, TU Darmstadt, Q. JI, B. LUDEWIGT, A. PERSAUD, LBNL, X. KONG, Lanzhou Univ., S.J. DE LEON, E. DOWLING, W.L. WALDRON, T. SCHENKEL, LBNL, J.J. BARNARD, A. FRIEDMAN, D.P. GROTE, LLNL, A. STEPANOV, Washington Univ., E.P. GILSON, I.D. KAGANOVICH, PPPL — Charged particle radiation effects in materials is important for the design of fusion plasma facing components. Also, radiation effects in semiconductor devices are of interest for many applications such as detectors and space electronics. We present results from radiation effects studies with intense pulses of helium ions that impinged on thin samples at the induction linac at Berkeley Lab (Neutralized Drift Compression Experiment-II). Intense bunches of 1.2 MeV He^+ ions with peak currents of 2 A, 1-mm beam spot radius and 2-30 ns FWHM duration create controlled high instantaneous dose rates enabling the exploration of collective damage effects. We use in-situ diagnostics to monitor transient effects due to rapid heating and the ionization and damage cascade dynamics. For tin, single pulses deposit sufficient energy in the foil to drive phase transitions. A new Thomson parabola to measures ion energy loss and charge state distributions following transmission of a few micron thick samples. In silicon, ion pulses induce free electron densities of order 10^{21} cm^{-3}.

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