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Absolute x-ray yields from laser-irradiated, Ge-doped aerogel targets K.B. FOURNIER, M.T. TOBIN, J.F. POCO, K.S. BRADLEY, S.B. HANSEN, Lawrence Livermore National Laboratory, C.A. COVERDALE, D.E. BEUTLER, M.R. SEVERSON, Sandia National Laboratory, E.A. SMITH, D.L. REEDER, Ktech Corporation — We have measured the production of $h\nu \geq 10$ keV x rays from low-density, Ge-doped aerogel targets at the OMEGA laser (LLE, U. of Rochester). The targets were 1.2mm long by 1.5mm diameter Be cylinders filled with Ge-doped (20 atomic%) SiO_2 aerogel. The doped-aerogel density was 4.8 or 6.5 mg/cc. These targets are a major advance over previous doped aerogels: instead of suspending the dopant in the SiO_2 matrix, the Ge atoms are incorporated directly in the matrix. Forty beams of the OMEGA laser ($\lambda = 351$ nm) illuminated the cylindrical faces of the target with a total power of ≈ 18 TW. The laser strongly ionizes the target ($n_e/n_{cr} \leq 0.1$–0.2), and allows the laser-bleaching wave to ionize supersonically the high-Z ions in the sample. Ge K-shell x-ray emission was spectrally resolved with a two-channel crystal spectrometer and recorded with temporal resolution with a set of calibrated photoconductive devices (PCDs). The heating of the target was imaged with a gated x-ray framing camera. 2-D rad-hydro calculations predict rapid and uniform heating over the target volume with minimal energy losses into hydrodynamic motion. The calculations predict 150–200 J of x-ray output with $h\nu \geq 10$ keV, in agreement with the measurements.
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