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X-ray Measurements of Laser Irradiated Foam Filled Liners[1]
SIDDHARTH PATANKAR, DEREK MARISCAL, CLEMENT GOYON, KEVIN BAKER, STEPHAN MACLAREN, JIM HAMMER, TED BAUMANN, PETER AMENDT, JOSEPH MENAPACE, BOB BERGER, Lawrence Livermore Natl Lab, BEDROS AFEYAN, Polymath Research Inc, MAX TABAK, SHAM DIXIT, SUNG HO KIM, JOHN MOODY, OGDEN JONES, Lawrence Livermore Natl Lab — Low-density foam liners are being investigated as sources of efficient x-rays. Understanding the laser-foam interaction is key to modeling and optimizing foam composition and density for x-ray production with reduced backscatter. We report on the experimental results of laser–irradiated foam liners filled with SiO_2 and Ta_2O_5 foams at densities between 2 to 30mg/cc. The foam liners consist of polyimide tubes filled with low-density foams and sealed with a gold foil at one end. The open end of the tube is driven with 250J of 527nm laser light in a 2ns 2-step pulse using the Jupiter Laser Facility at LLNL. A full aperture backscatter system is used to diagnose the coupled energy and losses. A streaked x-ray camera and filtered x-ray pinhole cameras are used to measure laser penetration into the low-density foam for different mass densities. A HOPG crystal spectrometer is used to estimate a thermal electron temperature. Comparisons with beam propagation and x-ray emission simulations are presented.

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