

Use of intense Z-Pinch X-rays for IFE materials studies of fusion target x-rays at reactor-level fluences

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In Inertial Fusion Energy (IFE), the explosion of fusion targets releases intense pulses of x-rays and ions. In some target chamber concepts (usually with indirect-drive targets, where > 20% of the yield can be in x-rays), sacrificial first surfaces are partially vaporized by target x-rays. The dynamics of the vaporization of these materials is important in the design of IFE chambers. The Z z-pinch facility at the Sandia National Laboratories-Albuquerque can generate x-rays with IFE target chamber relevant spectra, fluences and pulse widths in an environment that allows considerable breadth in sample materials. A project is in progress to perform experiments on Z to study the x-ray vaporization of several candidate IFE chamber wall materials. These include FLiBe, PbLi, carbon-carbon composites, graphite, tungsten and molybdenum. Initial experimental results will be presented, along with calculations with the BUCKY computer code. This work will be used to validate the BUCKY code and to build a data base of material response for IFE chamber design efforts.

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