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FLASH simulations of 120MJ target explosions in LIFE reactor chamber RYAN SACKS, GREGORY MOSES, Fusion Technology Institute, University of Wisconsin, MILAD FATENEJAD, The Flash Center for Computational Science, University of Chicago — The LIFE conceptual reactor design[1] is a 12 m diameter reaction chamber with a steel first wall. The chamber is filled with 6 μg/cm^3 Xenon gas to protect the wall from fusion burn products. Indirect drive 120 MJ fusion targets are shot at 13 Hz repetition rate. For purposes of simulating the target explosion the target is approximated as a 1 g lead hohlraum. Fusion burn product energy is added to the Pb in a 100 ps flattop source at a rate of 12 MJ / 100 ps. The additional 13 MJ of fusion energy is assumed to be radiated as prompt x-rays. The resulting spherical micro-explosion of the heated Pb target into the surrounding Xe is simulated in 2D using the FLASH radiation hydrodynamics code. The FLASH code[2] is an AMR block-structured, parallel scalable radiation hydrodynamics code. FLASH has separate electron and ion temperatures and single group or multi-group radiation diffusion. Shock generation in the Xe and mixing of the Pb and Xe behind the shock due to Rayleigh-Taylor instability is investigated. Comparison with results from the 1D BUCKY radiation hydrodynamics code will be presented. This work was supported by Lawrence Livermore National Laboratory under contract number B587835.

[1]Moses, E.I., Ignition on the National Ignition Facility: a path towards inertial fusion energy, *Nucl. Fusion* **49** 104022
[2]Fryxell, B., Olson, K. *et al.,*FLASH: An Adaptive Mesh Hydrodynamics Code for Modeling Astrophysical Thermonuclear Flashes, *Astro. Journal Sup. Series.*, **131**, 273

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