Visual Tsunami modeling of ballistic and assisted-pinch heavy-ion target chambers

Christophe S. Debonnel[1, 2], Simon S. Yu[2], and Per F. Peterson[1]

[1]*University of California, Berkeley, CA, debonnel@nuc.berkeley.edu*
[2]*Lawrence Berkeley National Laboratory, Berkeley, CA*

The Berkeley gas dynamics code TSUNAMI was recently employed to model two thick-liquid chambers: the neutralized ballistic RPD chamber [1], based on the HYLIFE-II design, and a novel assisted-pinch chamber [2]. Major revisions to the gas dynamics code TSUNAMI described in a companion paper [3] motivated a reinvestigation of previous gas transport studies. "Visual Tsunami" is therefore employed to update the modeling of the RPD chamber and the latest version of the assisted-pinch point design. Major improvements include a new real gas equation of state for the molten salt flibe, a new target output spectrum, and an improved ablation model.

Compared to previous recent simulations, new target and ablation models predict significantly more ablated mass and lower average specific energy, leading to higher impulses to thick-liquid jets. Increasing the pocket radius and/or adding more mass to the hohlraum to shift the target and hohlraum debris x-ray spectrum can mitigate this concern.

[1] C.S. Debonnel et al., "X-ray ablation and debris venting for the heavy-ion point design," *Fusion Science and Technology*, 44 (2), 274-278, 2003
[2] C.S. Debonnel et al., "Progress towards a detailed TSUNAMI modeling of the heavy ion fusion modular point design," presented at the international symposium on heavy ion inertial fusion, Princeton, June 7-11, 2004
[3] C.S. Debonnel et al., "Visual Tsunami: A versatile, user-friendly radiation hydrodynamics design code," these proceedings