

Lawrence Berkeley National Laboratory

Recent Work

Title

Progress towards a detailed tsunami modeling of the heavy ion fusion modular point design

Permalink

<https://escholarship.org/uc/item/2t10p0vw>

Authors

Debonnel, C.S.

Yu, S.S.

Peterson, P.F.

Publication Date

2005-06-01

PROGRESS TOWARDS A DETAILED TSUNAMI MODELING OF THE HEAVY ION FUSION MODULAR POINT DESIGN

C.S. Debonnel, S.S. Yu, Lawrence Berkeley National Laboratory, 1 Cyclotron
Road, Berkeley, CA, 94720

P.F. Peterson, University of California, Berkeley, CA 94720

The “robust point design” (RPD) [1] describes a self-consistent heavy-ion inertial fusion power plant based on a single linear accelerator and the neutralized ballistic beam transport scheme. The heavy-ion fusion community is exploring the feasibility of a modular power plant, with several, smaller accelerators---this approach has the potential to offer a faster and cheaper development path to a viable fusion power plant. The Berkeley hydrodynamics code TSUNAMI is being used to model x-ray ablation and gas venting in the target chamber and beam tubes of the yet-to-be-finalized modular point design. Gas dynamics simulations are presented along with a comparison to a previous RPD modeling [2]. The need for this modeling stems from strict requirements on background gas density set to achieve proper beam and target propagation; differences between limits imposed by various beam propagation schemes are highlighted.

This work was performed under the auspices of the U.S Department of Energy under contracts No. DE-AC02-05CH11231 and DE-FG03-97ER5441.

1. S.S. Yu, W.R. Meier, R.P. Abbott, J.J. Barnard, T. Brown, D.A. Callahan, C.S. Debonnel, P. Heitzenroeder, J.F. Latkowski, B.G. Logan, S.J. Pemberton, P.F. Peterson, D.V. Rose, G.-L. Sabbi, W.M. Sharp, D.R. Welch, “An updated point design for heavy ion fusion,” *Fusion Science and Technology*, **44-2** (2003) 266-273
2. C.S. Debonnel, S.S. Yu, P.F. Peterson “X-ray ablation and debris venting for the heavy-ion point design,” *Fusion Science and Technology*, **44-2** (2003) 274-278