Lawrence Berkeley National Laboratory
Recent Work

Title
End-to-End Modeling of a Heavy-Ion Fusion Accelerator

Permalink
https://escholarship.org/uc/item/5tv7c4kg

Author
Fawley, William M.

Publication Date
1997-11-01

eScholarship.org Powered by the California Digital Library
University of California

LBNL-40597
HIFAN 905a

Abstract Submitted
for the DPP97 Meeting of
The American Physical Society

Sorting Category: 2.1.1 (theoretical)

End-to-End Modeling of a Heavy-Ion Fusion Accelerator[1] W. M. FAWLEY, J.-L. VAY, Lawrence Berkeley National Laboratory, D. P. GROTE, W. M. SHARP, Lawrence Livermore National Laboratory — One of the main approaches to inertial fusion energy (IFE) employs a high-energy (E$\sim$ 5 GV), heavy-ion accelerator to produce an intense beam which, when focused onto the target capsule containing DT fuel, leads to thermonuclear ignition. We have begun an "end-to-end" computational modeling effort to examine design tradeoffs for a future advanced accelerator in the 10-100 kJ class. This effort includes both 2- and 3-D electrostatic and electromagnetic PIC codes to study the physics of ion-beam transport starting at the emission surface and ending at the target pellet. Areas of concern include beam quality preservation, permissible tolerances on the multitude of focusing elements within the main accelerator, optimized final focus designs, and multiple beam interaction effects both in the accelerator and reactor vessel. We present some initial results concerning needed focusing element alignment and full 3D transport of a beam through the final focus and reactor to the pellet, including the effects of longitudinal compression.

[1]Supported by the Director, Office of Energy Research, Office of Fusion Energy, U.S. Department of Energy, under Contracts No. DE-AC03-76SF00098. and W-7405-ENG-48

William M. Fawley
fawley@lbl.gov
Lawrence Berkeley National Laboratory

☐ Prefer Oral Session
☒ Prefer Poster Session

Special instructions: Please include this poster in the same session as the following theory posters submitted by the Heavy Ion Fusion group at LBNL:
(1) C. Celata, E. Lee, and A. Faltens: *Splitting of Intense High Energy Heavy Ion Beams*
(2) C.F. Chan and E. Lee: *A Computer Study of Beam Transport by Solenoids*

Date submitted: July 8, 1997 Electronic form version 1.2