

DYNAMICS OF NEUTRALIZING ELECTRONS AND THE FOCUSABILITY OF INTENSE ION BEAMS IN HIF ACCELERATING STRUCTURES*

A. F. Lifschitz, G. Maynard, Laboratoire de Physique des Gas et des
Plasmas, CNRS-UMR8578, Université Paris XI, Orsay, France

J.-L. Vay, Lawrence Berkeley National Laboratory, 1 Cyclotron Road Bldg
47/112, Berkeley, CA 94720, USA

In most of the proposals for HIF reactors, the beams propagate ballistically through the containment chamber. To get the required final radius (~ 3 mm), the charge of the beam must be neutralized to some extent. Several neutralization schemes are possible, as co-injection of negative-ions beams, inclusion of external sources of electrons, or it can be provided by electrons coming from ionization of the background gas. In this work, we study the role of the electron dynamic on the neutralization and final radius of the beam. This is done by performing fully-electromagnetic PIC simulations of the beam ballistic transport using the BPIC code[1]. We have considered for the atomic processes both ion-ion and electron-ion collisions. Differences in the behaviour of the electron populations (electrons coming from gas ionization, from beam ionization and co-injected at the chamber entrance) and their screening properties are presented, for beams of Pb and Xe moving in FLIBE gas.

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1 J.-L. Vay, C. Deutsch, Fusion Engineering and Design, **32-33** (1996) 467.