Title
Experimental study of space-charge waves in intense heavy ion beams

Permalink
https://escholarship.org/uc/item/5qm9140h

Authors
Bieniosek, F.M.
Faltens, A.
Prost, L.
et al.

Publication Date
2004-05-01
EXPERIMENTAL STUDY OF SPACE-CHARGE WAVES IN INTENSE HEAVY ION BEAMS *

F. M. Bieniosek†, A. Faltens†, L. Prost†, P. K. Roy†, P. A. Seid†, S. Eylon†, E. Henestroza†, W. Waldron†, S. S. Yu†, HIF-VNL

†Lawrence Berkeley National Laboratory, Berkeley, CA, USA

When a short-duration, small-amplitude energy perturbation is applied to an intense heavy-ion beam, positive- and negative-going longitudinal space charge waves are generated on the beam [1]. Longitudinal diagnostic kickers that provide ~1% energy perturbation have been implemented for generating space-charge waves on HCX and NTX beams. The kickers consist of specially-designed fast pulse generators combined with an existing aperture or ESQ structure to provide the longitudinal perturbation to the beam. The amplitudes of the resulting density waves are ~10%, measured a few meters downstream of the kicker. The time of flight of the wave provides an accurate measure of the beam energy. The time of flight measurements will be described. Comparison of measured waves with a simple 1-D fluid model [2] of the beam will be presented.


*This work performed under the auspices of the U.S Department of Energy by University of California, Lawrence Berkeley National Laboratory under contract DE-AC03-76SF00098.