

Abstract Submitted  
for the DPP06 Meeting of  
The American Physical Society

**Initial Operation of Laser-Induced Fluorescence Diagnostic System with Barium Ion Source in the Paul Trap Simulator Experiment<sup>1</sup>**

M. CHUNG, E.P. GILSON, R.C. DAVIDSON, M. DORF, P.C. EFTHIMION, R. MAJESKI, PPPL — Installation of a laser-induced fluorescence (LIF) diagnostic system has been completed and initial operation of the system has begun on the Paul Trap Simulator Experiment (PTSX). The PTSX device is a linear Paul trap that simulates the collective processes and nonlinear transverse dynamics of an intense charged particle beam propagating through a periodic focusing quadrupole magnetic configuration. A barium ion source has also been installed on PTSX and tested with the existing charge collector. Although there are several transition lines for the laser excitation of barium ions, the transition from the metastable state  $5^2D_{3/2}$  to the excited state  $6^2P_{1/2}$  is considered mainly because there exists a commercially available, stable, broadband, high-power laser system in this region of the red spectrum. The LIF system is composed of a dye laser, fiber optic transmission lines, a line generator which uses a Powell lens, collection optics, and a CCD camera system. Streaming operation of the PTSX device is considered for the initial tests of the LIF system to make optimum use of the metastable ions. With the long integration time ( $\sim 10$  sec) of the CCD camera and image intensifier, it is expected that the fluorescence image of the initial beam mismatch between the focusing channel and ion the source can be captured.

<sup>1</sup>Research supported by the U.S. Department of Energy.

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Date submitted: 20 Jul 2006

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