

Abstract Submitted  
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**Studies of Collective Dynamics and Excitations in Intense Charged Particle Beams and Barium Ion Source Optimization Using the Paul Trap Simulator Experiment**<sup>1</sup> HUA WANG, E.P. GILSON, R.C. DAVIDSON, P.C. EFTHIMION, R. MAJESKI, Princeton Plasma Physics Laboratory, L. D'IMPERIO, SUNY College at Oneonta — The Paul Trap Simulator Experiment (PTSX) is a cylindrical Paul trap that simulates the nonlinear transverse dynamics of intense charged particle beam propagation through an equivalent kilometers- long magnetic alternating-gradient (AG) focusing system. Understanding the collective dynamics and excitations of intense charged particle beam propagation is of great importance for a wide variety of accelerator applications. Envelope equations which describe the evolution of a Kapchinskij-Vladimirskij (KV) beam envelope will be discussed and experimental measurements of collective excitations will be compared with the theoretical results. A barium ion source is being developed to replace the cesium ion source in order to use a laser-induced fluorescence (LIF) diagnostic to study the ion density transverse profile and ion velocity distribution function. A schematic design and the planned characteristic operating parameters of this new barium ion source will be presented.

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