

# **ACCELERATOR SEMINAR**

## **“The Paul Trap Simulator Experiment: Studying Transverse Beam Dynamics in a Compact Laboratory Experiment”**

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The Paul Trap Simulator Experiment (PTSX) is a compact laboratory Paul trap that simulates propagation of a long, thin charged-particle bunch coasting through a kilometers-long magnetic alternating-gradient (AG) transport system by putting the physicist in the frame-of-reference of the beam. The goal is to understand the mechanisms behind emittance growth and halo particle generation in intense beams propagating over large distances. The transverse dynamics of particles in both systems are described by the same sets of equations - including all nonlinear space-charge effects. The time-dependent quadrupolar voltages applied to the PTSX confinement electrodes correspond to the axially-dependent magnetic fields applied in the AG system. An overview of PTSX results will be given, including: experiments in which the amplitude and/or frequency of the applied confining voltage is changed over the course of the experiment in order to transversely compress a beam both instantaneously and adiabatically; experiments in which the deleterious effects of random lattice noise is studied; and experiments to understand the interaction between the applied confining fields and transverse beam modes.

**Thursday, March 15, 2012**

**11:00 a.m.**

**CEBAF Center, Room L102/104**

**Coffee before seminar beginning at 10:45 a.m.**