Abstract Submitted
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Application of Piecewise Continuous Waveforms in the Paul Trap Simulator Experiment[1] M.S. GUTIERREZ, University of California, Los Angeles, E.P. GILSON, R.C. DAVIDSON, Princeton Plasma Physics Laboratory, A.N. KABCENELL, Weston High School — The Paul Trap Simulator Experiment (PTSX) is a compact linear Paul trap that simulates 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. Both systems share the same equations of motion which allows for many AG focusing configurations to be studied in a compact laboratory environment instead of a kilometers-long machine. AG systems contain discrete quadrupole magnets but have been modeled with a continuously varying sinusoidal field of equivalent average transverse focusing strength in PTSX. The average transverse focusing frequency characterizes the strength of the transverse confinement in the smooth focusing model, where fast oscillations are averaged over. Initial experimental results demonstrate the validity of the smooth focusing model by applying periodic-step waveforms and sinusoidal waveforms, of equal average transverse focusing strength, to the electrodes of the Paul trap and comparing the resulting radial density profiles.

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