Abstract Submitted
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Computational and experimental studies of charged particles in a scalable 1D spatial and temporal periodic potential created with twin periodic electrode curtains[1] OWEN MYERS, Materials Science Program, University of Vermont, JUNRU WU, Department of Physics, University of Vermont, JEFFREY MARSHALL, School of Engineering, University of Vermont — A Twin Electric Curtains (TEC) used in our study consists of two parallel planar arrays of linear electrodes. The electrodes are driven by an oscillating two-phase electric potential. The electric potentials applied to two electrodes of the TEC are in phase when the two electrodes are in the same vertical plane whereas the potentials of the neighboring electrodes in each planar array are 180° out of phase. A linear quadrupole trap is also used to constrain charged particles' motion to a straight line perpendicular and equidistant to the electrodes of the two electric curtain arrays where the component of the electric field generated by the TEC perpendicular to the axis of the quadrupole is zero. Dynamic motion of charged particles under excitation of electric field in the form $f(t)h(x)$ are studied, where $f(t)$ is periodic in time and $h(x)$ is periodic in space. The presentation will be on interesting single and multiple particle dynamic behavior including stable oscillations as well as propagating and chaotic characteristics. They may be considered as simple models related to current research in areas of molecular motors, Hamiltonian and artificial thermal ratchets, and the variety of particle transport phenomena that occur in self excited systems.

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