Abstract Submitted
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"Force Field" for Plasma Confinement[1] CARLOS ORDONEZ, University of North Texas — Theoretical research associated with producing an electromagnetic field referred to as a "force field" is reported. A force field is defined at present as a static electromagnetic field that has the following characteristics: (1) It has an effective range that is much smaller than the dimensions of a cloud, plasma or beam of charged particles that is confined by the field. (2) It can simultaneously reflect incident charged particles of either sign of charge. A force field could consist of a spatially periodic sequence of magnetic cusps that are electrostatically plugged using applied electrostatic potential variations similar to that found in nested Penning traps. For plasma confinement, a possible configuration consists of a sequence of coaxial ring cusps. The diameter of the ring cusps varies axially, with the smallest rings located near the axial ends of the confinement volume. Two point cusps that are coaxial with the ring cusps are located at the axial ends of the confinement volumes. A current-carrying wire placed along the axis of symmetry could be used to produce a minimum-B configuration. In the work reported, a theoretical understanding is developed of the single-particle reflection properties of a force field that confines a non-drifting, isotropic plasma.

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Carlos Ordonez
University of North Texas

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