Abstract Submitted
for the DAMOP10 Meeting of
The American Physical Society

Langmuir chains of ions in linearly and circularly polarized electromagnetic field crossed with the magnetic field MATT KALINSKI, Utah State University — We have recently discovered that so called Langmuir [1] states of Helium can stabilize in both the circularly polarized electromagnetic and the magnetic fields when the fields are crossed and two electrons are rotating in the configuration when the two parallel single-electron circular trajectories have the both particles moving in the spatial phase. The stability islands in the fields strength planes have exotic shapes and the configurations are bistable geometrically. Here we discover the whole chains of ions when the single Langmuir configuration is additionally experiencing the infinite chain of neighbouring ions and alike space-periodic configurations. This leads to self-stabilization and Born-Opennheimer binding of Hydrogen, helium or higher charged ions in chains parallel to the magnetic field and when the CP field vector is perpendicular. The excitations along the chain are plasmon-like and have the physical meaning of the deviation from the CP field rotation helicity. Ones the linearly polarized field is superposed from two circularly polarized counterrotating fields similar configurations exist by the geometric argument. Numerical simulations using the recently discovered Cartesian-hypespherical coordinates method previously applied to Langmuir configurations themself are also presented. [1] M. Kalinski, L. Hansen, and D. Farrelly, "Nondispersive Two-Electron Wave Packets in a Helium Atom," Phys. Rev. Lett. **95**, 103001 (2005).

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Date submitted: 21 Jan 2010 Electronic form version 1.4