

Abstract Submitted
for the DAMOP10 Meeting of
The American Physical Society

Ultracold dipoles on a ring SASCHA ZOELLNER, Niels Bohr Institute, Copenhagen (Denmark), GEORG M. BRUUN, STEPHANIE M. REIMANN, Lund University (Sweden) — Dipolar bosons and fermions in a quasi-one-dimensional (1D) ring potential have the interesting feature of combining the physics of 1D gases with anisotropic effects. Depending on the orientation of their dipole moments and the dipolar interaction strength, there may be a competition between repulsive and attractive regions on the ring. We identify three basic phases based on simulations in a few-body system: (i) a repulsive regime resembling an inhomogeneous 1D Bose (Fermi) gas, (ii) a Wigner-crystal-like state with a non-equidistant spatial distribution, and (iii) bound states of identical bosons (fermions) localized in the strongly attractive regions on the ring. We discuss how these states arise in a crossover from weak to strong dipolar interactions, with an emphasis on the particle-number dependence.

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Date submitted: 22 Jan 2010

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