Abstract Submitted
for the DAMOP11 Meeting of
The American Physical Society

Density wave patterns for fermionic dipolar molecules on a square optical lattice: Mean-field-theory analysis[1] KARLIS MIKELSONS, JIM FREERICKS, Georgetown University — We model a system of ultracold fermionic dipolar molecules on a two-dimensional square lattice. Assuming that the molecules are in their nondegenerate hyperfine ground state, and that the dipole moment is polarized perpendicular to the plane (as in the recent experiments on ^{40}K-^{87}Rb molecules), we approximate these molecules as spinless fermions with long range repulsive dipolar interactions. We use mean field theory to obtain the phase diagram as a function of the filling, the strength of interaction and the temperature. We find a number of ordered density wave phases in the system, as well as phase separation between these phases. A Monte Carlo analysis shows that the higher-period phases are usually suppressed in the exact solution.

[1]Supported by a MURI grant from Air Force Office of Scientific Research numbered FA9559-09-1-0617

Karlis Mikelsons
Georgetown University

Date submitted: 04 Feb 2011 Electronic form version 1.4