Abstract Submitted
for the DAMOP18 Meeting of
The American Physical Society

Towards two-dimensional quantum gases of strongly dipolar molecules[1] ADEN LAM, NICCOLO BIGAGLI, CLAIRE WARNER, DARBY BATES, SEBASTIAN WILL, Columbia University — In recent years, ultracold atoms have been successfully used to investigate strongly interacting quantum many-body systems. A new frontier is opened up by ultracold molecules. In particular, heteronuclear molecules in the rovibrational ground state with tunable dipolar interactions make the study of quantum systems with strong long-range interactions accessible and constitute a promising system for quantum simulation. At Columbia, we are constructing a new experimental setup geared to create and study novel phases in two-dimensional quantum systems of ultracold dipolar molecules. In a regime where repulsive dipolar interactions dominate, the emergence of a self-organised crystalline phase is predicted. Upon reducing the interaction strength, a quantum phase transition into a dipolar superfluid is expected, as well as the possible appearance of a supersolid. In our setup, we will use DC and AC electric fields to control the dipolar interactions. In addition, we will be able to observe 2D quantum phases via high resolution imaging.

[1]This research is supported by the Sloan Foundation.

Aden Lam
Columbia University

Date submitted: 15 Mar 2018 Electronic form version 1.4