



清华大学高 研究院

Institute for Advanced Study, Tsinghua University

- Title:** Two-dimensional dipolar Fermi gases
- Speaker:** Dr. Meera Parish (*London Centre for Nanotechnology*)
- Time:** 3:30pm, Wednesday, April 17, 2013
- Venue:** Conference Hall 322, Science Building, Tsinghua University

Abstract

Ultracold atomic gases provide an exceptionally clean and controllable system in which to explore quantum many-body phenomena. Thus far, the focus has been on short-range interactions, since these well describe atom-atom scattering in the low energy limit. However, the recent creation of polar molecules with electric dipole moments has ignited interest in long-range dipolar interactions.

In this talk, I will examine the phases of a two-dimensional gas of fermionic polar molecules, where the molecule dipole moments are all aligned by an external electric field. I will show that such a gas can spontaneously break rotational symmetry and form a density wave (or stripe phase) for sufficiently strong repulsive interactions. This provides a model example of a density wave that is purely driven by repulsion rather than, e.g., distortions of an underlying lattice.

References:

- [1] M. M. Parish & F. M. Marchetti, Phys. Rev. Lett. 108, 145304 (2012).
- [2] F. M. Marchetti & M. M. Parish, Phys. Rev. B 87, 045110 (2013).