Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

**Repulsive polarons in two-dimensional Fermi gases** VUDTIWAT NGAMPRUETIKORN, JESPER LEVINSEN, University of Cambridge, MEERA PARISH, London Centre for Nanotechnology — We consider a single spin-down impurity atom interacting via an attractive, short-range potential with a spin-up Fermi sea in two dimensions (2D). Similarly to 3D, we show that the impurity can form a metastable state (the "repulsive polaron") with energy greater than that of the non-interacting impurity. Moreover, we find that the repulsive polaron can acquire a finite momentum for sufficiently weak attractive interactions. Even though the energy of the repulsive polaron can become sizeable, we argue that saturated ferromagnetism is unfavorable in 2D because of the polaron's finite lifetime and small quasiparticle weight.

Vudtiwat Ngampruetikorn
University of Cambridge

Date submitted: 07 Nov 2011 Electronic form version 1.4