Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Exact calculations of strongly paired fermions in two dimensions[1]

SIMONE CHIESA, SHIWEI ZHANG, College of William and Mary — The problem of strongly interacting superfluid Fermi gas has attracted considerable interest, especially in three-dimensions at unitarity. Although the corresponding problem in two-dimensions does not have a unitarity limit per se, it is expected to offer a rich interplay between the interaction strength and density. A quantitative understanding is important, particularly in light of its possible experimental realization with cold atoms. To this end, we have carried out auxiliary-field quantum Monte Carlo simulations on large system sizes. The ground-state energy is obtained for an unpolarized gas with a zero-range attractive interaction. The calculations are exact, and are performed using a BCS trial wave function that greatly reduces the statistical fluctuation. We present the calculated equation of state as a function of $k_F a$, and make comparisons with BCS and other results. Other ground-state observables will also be discussed.

[1]We acknowledge NSF and DOE for support, and INCITE and Blue Waters for computing.

Simone Chiesa
College of William and Mary

Date submitted: 15 Nov 2013 Electronic form version 1.4