

Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Interaction and Disorder Effects across BCS-BEC Crossover in Two-Dimensional Fermi Gases B. TANATAR, A. KHAN, Bilkent University
— We investigate the effect of static impurities in two-dimensional ultracold atomic Fermi gases. We incorporate disorder from impurities through fluctuations and study its effects on the BCS-BEC crossover. We analyze the effect of quenched disorder for various physical quantities such as chemical potential, pairing gap, density of states, spectral function, and ground-state energy. We extend our study further towards the experimentally viable quantities such as condensate fraction, sound velocity and Landau critical velocity. The results are presented as a function of binding energy and scattering length. We observe negligible effect of disorder in 2D for BCS Cooper pairs and considerable amount of depletion in the BEC regime but intriguingly the results also reveal that disorder effect is masked at the crossover region.

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Date submitted: 10 Nov 2014

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