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BKT physics in trapped 2D Bose and Fermi gases

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I will discuss superfluid and spatial coherence properties of two-dimensional trapped Fermi gases in the BEC-BCS crossover regime [1]. On the bosonic side, experimental data are in quantitative agreement with path-integral quantum Monte Carlo calculations of point like molecules up to large values of the interaction. Algebraic correlations in the first-order correlation function characterize the phase below the Kosterlitz-Thouless transition temperature. Whereas the inhomogeneous trapping potential introduces important quantitative modifications, the effective exponent of the power-law decay at the superfluid transition remains approximately constant for all interaction strengths in the BEC-BCS crossover regime.

P.A. Murthy, I. Boettcher, L. Bayha, M. Holzmann, D. Kedar, M. Neidig, M.G. Ries, A.N. Wenz, G. Zuern, and S. Jochim, Phys. Rev. Lett. 115, 010401 (2015).