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Quantized vortices in two-dimensional ultracold Fermi gases

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In two-dimensional superfluids quantized vortices play a key role in
determining finite-temperature properties, as the superfluid phase and the normal state are separated by a vortex unbinding transition,
the Berezinskii-Kosterlitz-Thouless transition. Very recent experiments with two-dimensional superfluid fermions [1] motivate the present work: we present theoretical results [2] based on Gaussian fluctuations [3] and the renormalization group showing that the universal jump of the superfluid density and the critical temperature crucially depend on the interaction strength. Our predictions provide a strong benchmark for forthcoming investigations.

[1] V. Makhalov et al. Phys. Rev. Lett. 112, 045301 (2014);
M.G. Ries et al., Phys. Rev. Lett. 114, 230401 (2015);
I. Boettcher et al., Phys. Rev. Lett. 116, 045303 (2016).

[2] G. Bighin and L. Salasnich, Sci. Rep. 7, 45702 (2017).

[3] L. Salasnich, Phys. Rev. Lett. 118, 130402 (2017).

Autore principale: Prof. SALASNICH, Luca (University of Padova)

Relatore: Prof. SALASNICH, Luca (University of Padova)

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