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Fluctuation-induced first-order superfluid transition in unitary $SU(n)$ Fermi gases

We use the functional renormalization group to study the superfluid phase transition in unitary $SU(n)$-symmetric Fermi gases. For $n \geq 4$ critical fluctuations invalidate mean-field theory and drive the transition first-order. We calculate the critical temperature and the jumps in the superfluid gap and the entropy density as functions of spin multiplicity n. All discontinuities grow with n, indicating an increasingly pronounced phase transition.

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