

Universal Non-Analytic Fermi Liquid Behavior of an SU(N) Fermi Gas

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We theoretically study the non-analytic equation of state of a cold SU(N) Fermi gas. It has been known that Landau's Fermi liquid theory yields non-analytic corrections to density and spin susceptibility, but a good comparison between theory and experiment has been lacking due to, among other reasons, difficulties in quantifying quasi-particle interactions. Cold quantum gas is ideal for investigating this long-standing problem, for it offers direct experimental access to the equation of state, and the emergent SU(N) symmetry can potentially boost the non-analytic behavior. Our theoretical effort maps out the equation of state, and reveal non-analytic crossover behavior stemming from the interplay of temperature and effective magnetic field.

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