Magnetic instabilities in spin imbalanced ultracold Fermi gases

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states of spin imbalanced ultracold Fermi gases near a broad Feshbach resonance by
analyzing the unstable collective magnetization modes developed when the system
is placed on the BEC side. Within the approximation of momentum independent
interatomic scattering, transverse magnetization instabilities appear at lower critical
interaction strengths than those corresponding to the longitudinal instabilities, sug-
gest ing that the former ones are primarily responsible for driving the system into a
textured state with inhomogeneous magnetization direction. The critical interaction
for the onset of transverse instabilities increases with polarization. However the sys-
tem already has ferromagnetic character below these interaction strengths because
of a change in sign of the spin stiffness which occurs close to the Stoner transi-
tion of the corresponding unpolarized gas. We also discuss the behavior expected
beyond the momentum independent scattering approximation across the resonance
for, both, the superfluid and ferromagnetic instabilities present in the system and
the implication of these results for experiments.

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