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Collective spin modes in a Fermionic atomic gas JOHN FELDMANN, HARI DAHAL, Boston College, SERGIO GAUDIO, University of Rome La Sapienza, KEVIN BEDELL, Boston College — We present our theoretical findings on the structure of the spin mode dispersion of a spin-population-imbalanced Fermionic atomic gas in the highly degenerate regime, but above the superfluid critical temperature, near a Feshbach resonance. We employ standard Fermi liquid theory to describe a gas consisting of two species of spin, up and down, existing in an external magnetic field, which models an atom gas of ^6Li atoms in the two lowest Zeeman states. The spin population imbalance creates a net magnetization, and as a result, the transverse magnetization propagates through the system. We find that a diverging scattering length, as occurs near a Feshbach resonance, affects the phenomenological Landau parameters of the system, whose relation to the scattering length is described by the induced interaction model, and thus in turn affects the structure of the collective spin modes, as well.

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