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Ferromagnetism of strongly interacting Fermi gases in the upper branch of Feshbach resonances

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In this talk, I discuss the question of ferromagnetism in strongly interacting two-component Fermi gases in the upper branch of Feshbach resonances. I first examine theoretically the necessary conditions for the system to be in the upper branch and formulate a theoretically tractable approach based on variational wave functions. Relevant experiments will be reviewed in light of the above theoretical understanding and their implication for the occurrence of ferromagnetism will be discussed critically. In particular, I discuss in some detail the recent MIT colliding cloud experiment and argue that at short times, the bouncing of the clouds indicates upper branch physics with effective repulsive interaction favoring phase separated configuration of two spin components [1].

[1] E. Taylor, S. Zhang, W. Schneider and M. Randeria, Phys.Rev.A 84 063622 (2011)