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**Studying the BCS-BEC crossover regime with a Fermi gas of $^{40}$K atoms**

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Recent years have seen the emergence of an intriguing Fermi system achieved with ultracold atomic gases. With these systems it is possible to widely tune the s-wave interatomic interaction strength using a Feshbach resonance. Of particular interest is the strongly interacting regime ($-1 < 1/k_F a < 1$) where a crossover between BCS theory of superconductivity and Bose-Einstein condensation (BEC) of molecules occurs. Recently experiments with $^6$Li and $^{40}$K have succeeded in studying many aspects of this superfluid Fermi system. In my talk I will discuss recent experiments performed at JILA on this Fermi system using $^{40}$K.