

Specific heat and strong-coupling effects in the BCS-BEC crossover regime of an ultracold Fermi gas

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Quantum
Correlations

Interacting Many Body
Fermion System

Thermodynamics

Ideal System

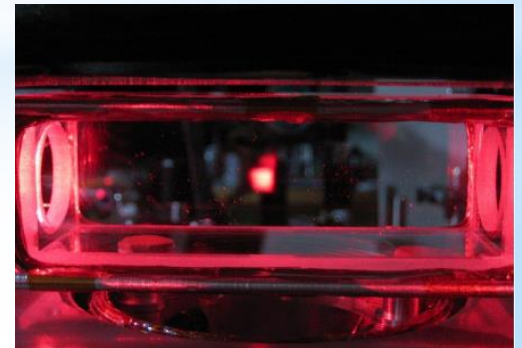
Ultracold
Fermi Gas



Clean
System



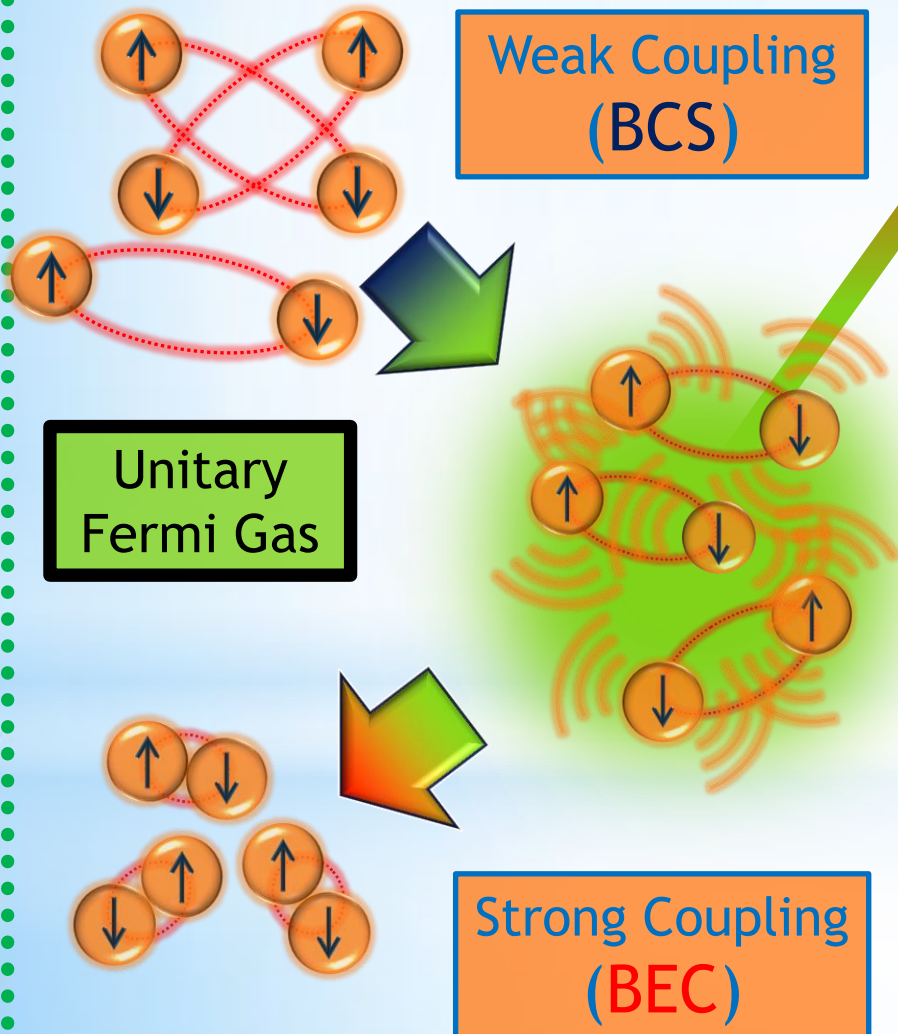
Tunable
Interaction



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BCS-BEC Crossover



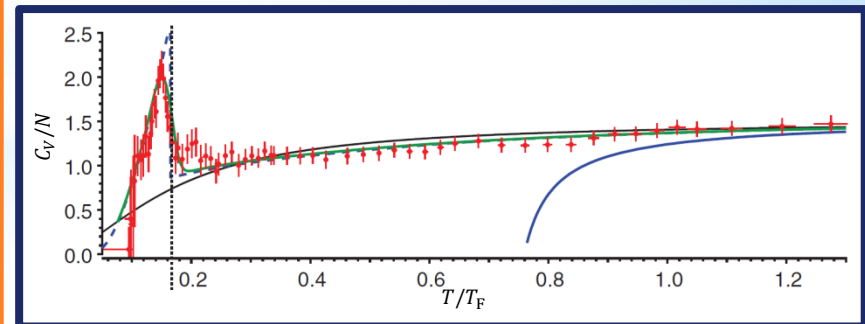
Strong Coupling Effects
“Pairing Fluctuations”

“Change in Entropy”

||

Specific Heat

Experiment at Unitarity



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Strong coupling corrections to specific heat within a Gaussian fluctuation (NSR) level at T_c

$$\Omega_{\text{NSR}} = \text{[Diagram 1]} + \text{[Diagram 2]} + \text{[Diagram 3]} + \dots$$

The diagrams represent Feynman diagrams for the NSR calculation. Diagram 1 is a single loop with a dashed vertical line. Diagram 2 is a double loop with a dashed horizontal line. Diagram 3 is a double loop with dashed horizontal and vertical lines.

