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### Few-body physics with a degenerate Fermi gas

The tremendous progress in preparing and studying strongly interacting ultracold fermions over the past years motivated us to start a new experimental effort with two main projects: To the spin mixture of two spin states of  $^6\text{Li}$ , like it is typically used for experiments in the BEC-BCS crossover we have added a third spin state. We believe that this three-component system is especially interesting because of its  $SU(3)$  symmetry that it shares for example with the three colors of the quarks. Recently, we have studied the collisional properties of such a gas and found evidence for a three-body resonance. In future experiments we aim at observing collective effects in this three-component Fermi gas.

In a second effort, we are setting up a micron-sized optical dipole trap, in which we aim to trap a finite number of fermions, which with its tunable scattering properties, particle number and confinement can be an ideal model system to test few-body theories.



7. November 2008, 15:30 Uhr

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