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Experiments on a mixture of bosonic and fermionic superfluids

We will present the experimental realization of a mixture of Bose and Fermi superfluids. Our mixture is composed of a weakly-interacting 7Li BEC at equilibrium with a 6Li Fermi superfluid in the BEC-BCS crossover. To study its properties we excite oscillations of the center-of-mass (dipole modes). In a regime of small relative velocity we observe long lived oscillations of the two superfluids. A precise spectroscopy of these low-lying modes gives us access to equilibrium properties, namely the mean-field interaction between the two species and the equation of state of the Fermi superfluid. When the relative velocity exceeds a critical value, we observe a strong damping of these modes in accordance with the general properties of superfluid flows.

8. Mai 2014, 14:00 Uhr

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