E. ALTMAN

Title: Non equilibrium spin dynamics in strongly interacting Fermi gases

Abstract: We propose an experiment to probe magnetic phenomena in an ultracold Fermi gas, while alleviating the sensitivity to three-body loss and competing many-body instabilities. The system is initialized in a small pitch spin spiral, which becomes unstable in the presence of repulsive interactions. To linear order the exponentially growing collective modes exhibit critical slowing down close to the putative Stoner transition point. Also, to this order, the dynamics are identical on the paramagnetic and ferromagnetic sides of the transition. However, we show that scattering off the exponentially growing modes qualitatively alters the collective mode structure. The critical slowing down is eliminated and in its place a new unstable branch develops at large wave vectors. Furthermore, long-wavelength instabilities are quenched on the paramagnetic side of the transition. We study the experimental observation of the instabilities, specifically addressing the trapping geometry and how phase-contrast imaging will reveal the emerging domain structure. These probes of the dynamical phenomena could allow experiments to detect the transition point and distinguish between the paramagnetic and ferromagnetic regimes.

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N. BLUEMER

Title: Double occupancy as a universal probe for antiferromagnetic correlations and entropy in cold fermions on optical lattices

Ultracold fermionic atoms on optical lattices have been proposed as quantum simulators of correlated solids. A missing link towards this goal is the experimental realization of antiferromagnetic (AF) phases and detection of AF order. This failure is commonly attributed to cooling issues. Indeed, the coldest systems achieved so far have central entropies per particle of $s=s/(N\,k_B)\approx \log(2)$ while AF long-range order is expected in a cubic system only for $s<\log(2)/2$.

In my talk, I will argue that this discrepancy is no obstacle for the experiments currently performed or prepared in this context: both modulation spectroscopy [1] and the superlattice approach [2] address the nearest-neighbor correlation function, similarly to the double occupancy D which we have recently suggested as a signature of AF correlations [3]: within DMFT, the development of (local) AF order at low T and strong coupling is accompanied by a distinct enhancement of D. I will show, by comparisons with direct determinantal QMC calculations, that this DMFT scenario applies even in two dimensions, for which the Néel temperature is zero, and is precise on the percent level, up to rounding effects, for a cubic optical lattice [4]. As a function of entropy s, D is nearly universal with respect to dimensionality; in particular, the minimum in D(s) always occurs at $s \approx \log(2)$ at strong coupling, as predicted by DMFT. Long-range order appears irrelevant for the current search of AF signatures in cold fermions. Thus, experimentalists need not achieve $s < \log(2)/2$ and should consider lower dimensions, for which the AF effects are larger.

[1] D. Greif, L. Tarruell, T. Uehlinger, R. Jördens, and T. Esslinger, Phys. Rev. Lett. 106, 145302 (2011)
[2] S. Trotzky, Yu-Ao Chen, U. Schnorrberger, P. Cheinet, and I. Bloch, Phys. Rev. Lett. 105, 265303 (2010); K.G.L. Pedersen, B.M. Andersen, G.M. Bruun, O.F. Syljuasen, and A.S. Sorensen, arXiv:1105.4466
[3] E.V. Gorelik, I. Titvinidze, W. Hofstetter, M. Snoek, and N. Blümer, Phys. Rev. Lett. 105, 065301 (2010)
[4] E.V. Gorelik, T. Paiva, R. Scalettar, A. Klümper, and N. Blümer, arXiv:1105.3356

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J. BRAND

Title: <u>Traveling dark solitons in the superfluid Fermi gas across the BEC-BCS crossover</u>

Abstract: Families of dark solitons exist in superfluid Fermi gases. The energy-velocity dispersion and number of depleted particles completely determine the dynamics of dark solitons on a slowly varying background density. For the unitary Fermi gas, we determine these relations from general scaling arguments and conservation of local particle number. We find solitons to oscillate sinusoidally at the trap frequency reduced by a factor of $1/\sqrt{3}$. Numerical integration of the time-dependent Bogoliubov–de Gennes equation determines spatial profiles and soliton-dispersion relations across the BEC-BCS crossover, and proves consistent with the scaling relations at unitarity.

B. CAPOGROSSO-SANSONE
Title: Quantum phases of bosonic polar molecules in optical lattice geometries

Abstract: In this talk I will be addressing properties of a gas of polar bosonic molecules confined in a single layer geometry and in a stack of N identical one- and two- dimensional optical lattice layers (the molecular dipole moment is aligned perpendicular to the layers). For the single layer geometry I focus on how the presence of atoms affects molecular solid phases stabilized by dipolar interactions. For the many layers geometry, I study properties of quantum flexible chains. A quantum roughening transition of the single chain (formed by a single molecule on each layer) is observed. The latter is studied by means of quantum Monte Carlo simulations of the extended Bose-Hubbard model. The in-layer finite density case, instead, is studied in the framework of the J-current model approximation. A quantum phase transition from an independent molecular superfluid phase to a rough chain superfluid phase is observed.

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N. COOPER
Title: Optical Flux Lattices for Ultracold Atomic Gases

Abstract: I will describe how simple laser configurations can give rise to "optical flux lattices”, in which optically dressed atoms experience a periodic effective magnetic flux with high mean density. These potentials lead to narrow energy bands with nonzero Chern numbers. Optical flux lattices will greatly facilitate the achievement of the quantum Hall regime for ultracold atomic gases.

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P.D. DRUMMOND
Title: Entropy in strongly interacting Fermi gases

Abstract: Entropy is a fundamental quantity in ultra-cold atomic physics. As shown in John Thomas' pioneering experiments, the use of tunable Feshbach resonances, combined with adiabatic passage allows the direct measurement of the entropy in an ultra-cold strongly interacting Fermi gas. This quantity is related to state purity and quantum information. However, it is nontrivial to calculate the entropy of a

strongly interacting Fermi system, and standard Monte Carlo techniques do not give the entropy.
We obtain theoretical predictions of the entropy and related thermodynamic quantities for the universal state-equation of a strongly-interacting Fermi gas using diagrammatic approximations. We show that, near the critical point, there are strong discrepancies between the different strong-coupling theories, which can be resolved by recent experimental measurements. Alternative forms of the entropy, called the Renyi entropy, are useful in quantum information, and are simpler to calculate in finite systems. We obtain the Renyi entropy for a non-interacting Fermi gas. This provides a route for direct experimental measurement of Renyi entropies via adiabatic passage. Another technique for finite temperature computational simulation of strongly interacting Fermi systems is to use Gaussian operator phase-space expansions. Using this method, an algorithm for probabilistically simulating the Renyi entropy in fermionic phase-space is derived using Grassmann integration.

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T. ESSLINGER
Title: Synthetic Quantum Many-Body Systems

Abstract: The quantum gas approach to many-body physics is fundamentally different from the path taken by other condensed matter systems, where experimentally observed phenomena trigger the search for a theoretical explanation. In quantum gas research, the starting point is a synthetically created many-body model that can be realized in an experiment. The study of the system then leads to the observation of fundamental phenomena such as crossovers and phase transitions. The challenge for the research field of quantum gases is to gain distinctive and new insights into quantum many-body physics by answering long-standing questions of an underlying model or by creating many-body systems of an entirely new character. In this talk I will discuss quantitative experiments with strongly-correlated fermions in optical lattices and the Dicke quantum phase transition in a Bose-Einstein condensate coupled to a high-finesse cavity which leads to the formation of a supersolid state.

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A. FOERSTER

Title: Exactly solvable models and ultracold atoms

Abstract: We investigate some Bethe ansatz integrable models in the context of ultracold atom systems. First we briefly discuss a simple bosonic model.
Then exactly solvable models of ultracold Fermi gases are examined via their thermodynamic Bethe Ansatz solution. Analytical and numerical results are obtained for the thermodynamics and ground state properties of two- and three-component one-dimensional attractive fermions with population imbalance. The numerical solution of the dressed energy equations for these models confirm that the analytical expressions for the critical fields and the resulting phase diagrams at zero temperature are highly accurate in the strong coupling regime [1]. The results provide a description of the quantum phases which are applicable to experiments with cold fermionic atoms confined to one-dimensional tubes.

[1] M.T. Batchelor, A. Foerster, X.W. Guan, and C. Kuhn, JSTAT 12 (2010) P12014

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A. GEORGES

Title: Trapping, cooling and probing fermionic atoms into the Mott and Neel states

Abstract: A new form of quantum condensed matter physics has emerged from the study of ultra-cold fermionic atoms in optical lattices. Recently, the incompressible Mott regime has been reached in experiments. I will present theoretical/computational studies and comparison to experiments at intermediate temperatures which validate the concept of optical lattice emulation of many-body fermionic systems. I will also discuss one-particle spectroscopic probes analogous to angular-resolved photoemission in solid-state physics.

References:

L. De Leo, C. Kollath, A. Georges, M. Ferrero, and O. Parcollet, Phys. Rev. Lett. 101, 210403 (2008)

J.-S. Bernier et al. Phys. Rev. A 79, 061601 (2009)

R. Jördens et al. Phys. Rev. Lett. 104, 180401 (2010)

J.-S. Bernier et al., Phys. Rev. A 81, 063618 (2010)

L. De Leo et al., Phys. Rev. A 83, 023606 (2011)

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S. GIORGINI
Title: Itinerant ferromagnetism in a repulsive Fermi gas and normal Fermi liquid behavior

Abstract: I will report on studies of repulsive and attractive branches of a two-component normal Fermi gas in the BCS-BEC crossover by means of quantum Monte Carlo simulations. The results for the repulsive branch are relevant to the question of the emergence of itinerant ferromagnetism in the gas. I will discuss the zero-temperature equation of state of both balanced and unbalanced mixtures resulting in the phase diagram in the interaction-polarization plane. The critical density for the onset of ferromagnetic behavior and the stability of the fully ferromagnetic state will also be addressed.
I will also report on recent calculations of the attractive normal branch for a balanced gas close to the unitary limit. This branch is unstable due to pairing, but it can be stabilized by temperature or polarization. We obtain good agreement with recent experiments carried out at ENS extrapolated to zero unbalance and we also find that the gas is well described by Landau theory of Fermi liquids. This latter result can shed some light on the possible existence of the pseudo-gap phase above the superfluid transition temperature.

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R. GRIMM
Title: Strongly Interacting Fermi-Fermi Mixture: Creation and First Experiments

Abstract: We report on the creation of a strongly interacting Fermi-Fermi mixture of Li-6 and K-40 atoms, and on first experiments exploring the many-body physics of this novel system. As an important prerequisite, we discuss the properties of the 155-G interspecies Feshbach resonance [1], which we exploit for tuning the s-wave scattering length to large values. As a first step into the regime of strong interactions, we recently investigated the hydrodynamic expansion of the mixture after release from the trap [2]. In our present experiments, we focus on the polaronic regime of K-40 impurities in a large Fermi sea of Li-6. We use radio-

frequency spectroscopy to investigate the interaction properties of the strongly interacting system.

[1] D. Naik et al., Eur. Phys. J. D (2011)
[2] A. Trenkwalder et al., Phys. Rev. Lett. 106, 115304 (2011)

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T.-L. HO

Title: The nature of the ``upper branch" Fermi gas, and a new route to strong interaction

Abstract: In this talk, we present a field theoretic approach for the so-called ``upper branch" Fermi gas. We shall present our results on the behavior of the energy, compressibility, and spin susceptibility of the upper branch Fermi gas, and point out the physical reasons for these properties. In addition, we shall also present a set of rigorous conditions for first order transition to itinerary ferromagnetism, and discuss the how well these conditions are met by current experimental data.

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S. JOCHIM

Title: Fermionization of two distinguishable fermions

Abstract: As the building blocks of matter, few-fermion systems such as atoms and nuclei play an essential role in nature. We have prepared systems containing 1-10 atoms with exquisite control over the many-body quantum state with fidelities exceeding 90% [1]. Such systems are particularly interesting as the interaction strength can be tuned using Feshbach resonances, enabling the realization of strongly correlated few-body systems.
We prepare these systems starting from a degenerate spin mixture of 6Li atoms in an optical dipole trap. With this trap we overlap a µm-sized tightly focused dipole trap resulting in a substantial enhancement of the degeneracy inside the microtrap. After thermalization we remove the reservoir that contains some 10000 atoms. We spill most of the remaining ~600 atoms in a controlled way by applying a tilt to the microtrap using a magnetic field gradient, such that only very few quantum states remain in the trap. Due to the aspect ratio of 10:1, the small number of atoms in

this trap is in the quasi 1-D regime.
In a first set of experiments we compare the energy of two distinguishable fermions in the ground state (spin up and down) with tunable repulsive interactions to the energy of two identical spin-up fermions in the two lowest vibrational states. In this way we identify the point where the two distinguishable atoms become "fermionized", i.e., they possess the same spatial correlations as the identical ones. Next steps include the study of attractive systems, where one expects to observe a paring gap that strongly depends on the exact particle number.
[1] F. Serwane et al., Science 332, 336 (2011)

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M. KOEHL
Title: Two-dimensional Fermi gases

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C. KOLLATH
Title: Cooling and detection of fermionic gases in optical lattices

Abstract: Fermionic gases in optical lattices are promising canditates to simulate long standing questions from condensed matter theory. However, up to now temperature and limited probing schemes hinders the characterization of many complex quantum phases. I will report on recent theoretical and experimental progress on the determination of the temperature in these lattice systems. I further outline a new way how to cool these gases efficiently to low temperature and how to probe different features of these gases.

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M. McNEIL FORBES
Title: Benchmarking the Fermion Many-body Problem: Precision bounds for the Unitary Fermi Gas

Abstract: In this talk I shall advocate for precision benchmarks in one of the simplest many-body systems: the unitary Fermi gas. The precision of both experiment and theory describing this strongly coupled many-body system has

finally reached the point of establishing a solid benchmark for aspects of many-body theories.
In particular, I shall describe a precision bound for the T=0 equation of state based on a careful analysis of Monte Carlo data including both extrapolation to the zero range limit and using a Density Functional Theory (DFT) to extrapolate to the thermodynamic limit. I may also describe some of the related highlights from the recent INT program to benchmark many-body theory.

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T. MUKAIYAMA
Title: Measurement of an Efimov Trimer Binding Energy in a Three-Component Mixture of 6Li

Abstract: Owing to magnetically induced Feshbach resonances, ultracold atomic systems turned out to be the one of the best systems to study Efimov physics systematically. Since the first experimental evidence in an ultracold cesium gas, general properties of few-body systems near unitarity such as the universal scaling relations between the loss features were confirmed in several ultracold bosonic systems and a three-component fermionic gas of 6Li, via the inelastic collision enhancements and minima occurring at particular magnetic-field values. Although some experimental results show remarkable agreement with universal theory, others are only qualitatively explained by universal theory, and the positions of observed loss features are shifted significantly from the predictions by universal theory based on a fixed three-body parameter. Therefore, the precise determination of the three- body parameter is crucial for understanding these systems. Here I will present on our measurements of the binding energy of the Efimov trimer state and the precise determination of the three-body parameter. In particular, we measured the temperature dependence of the RF spectrum, and found a significant shift with temperature. Eliminating this shift by lowering the temperature, we found that the measured energies significantly deviate from the previous predictions. Refining the model to fit these measurements, we obtain a non-monotonic energy dependence of the three-body parameter.

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S. OSPELKAUS
Title: Molecular collisions and chemical reactions in the quantum regime

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L.P. PITAEVSKII
Title: Dynamics of trapped solitons across BCS-BEC crossover

Abstract: We study the soliton oscillation in a harmonically trapped superfluid on the basis of local density approximation. We derive an exact equation relating the phase jump across the soliton to its energy The equation yields an explicit expression for the soliton period in terms of observable quantities. We test the theory in a superfluid Fermi gas across the BEC-BCS crossover, by solving the time-dependent Bogoliubov-de Gennes equations, with particular attention to the unitarity regime. The calculations show that the period of the oscillation significantly increases as the soliton becomes shallower on the BCS side of the resonance. The value of the period is in reasonable agreement with the general theory. We propose experimental protocols to test our predictions. We show that at large velocity the soliton becomes unstable and provide a physical interpretation of this instability.

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G. PUPILLO
Title: Quantum and classical dynamics of dipolar gases in low dimensions

Abstract: We discuss quantum and classical phases of molecular and atomic gases with dipolar interactions confined to low dimensions. We focus on gases of groundstate polar molecules and Rydberg-excited alkali atoms and discuss opportunities to observe several exotic phases in these systems, such as composite molecular liquids and the elusive free-space supersolid. We discuss some of these phases in the context of open driven-dissipative dynamics with atoms and molecules.

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A. ROSCH
Title: Dynamics of ultracold fermions in optical lattices

Abstract: The dynamics of ultracold atoms in optical lattice is often governed by the time scales needed to transport energy and particles over large distances. We investigate this physics for several situations: We study, for example, how and on what time scales negative absolute temperatures can be reached by reverting the external confining potential. In the presence of a constant force due to gravity, a fermionic atomic cloud expands symmetrically such that gains of potential energy at the top are compensated by losses at the bottom. Interactions stabilize the necessary heat currents. An analytic solution to the relevant hydrodynamic equations allows for a precise quantitative description of the expansion.

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C.A.R. SA DE MELO
Title: Compressibility and spin susceptibility in the evolution from BCS to BEC superfluids

Abstract: The relation between the isothermal compressibility and density fluctuations in mixtures of two-component fermions with population or mass imbalance is described. A generalized version of the fluctuation-dissipation theorem which is valid for any binary mixture is presented, and the possibility of extracting critical exponents for the isothermal compressibility and spin susceptibility via measurements of density fluctuations is discussed [1,2]. In the presence of trapping potentials, the local compressibility, local spin-susceptibility, and local density-density correlations may be obtained from experiments via a generalized local fluctuation-dissipation theorem, which is valid beyond the local density approximation. Lastly, theoretical calculations of the local compressibility, local spin susceptibility and local density-density fluctuations are described within the local density approximation, and connections to experimental results based on the fluctuation-dissipation theorem are made. Such comparisons may help in elucidating the validity and limitations of the local density approximation often used in the description of thermodynamic properties of ultra-cold fermions.
[1] Kangjun Seo and C. A. R Sá de Melo, arXiv:1101.3610v1 (2011)
[2] Kangjun Seo and C. A. R. Sá de Melo, to be posted in arXiv by May 31, 2011.

C. SALOMON

Title: Thermodynamics of Quantum Gases

Abstract: Ultracold dilute atomic gases can be considered as model systems to address some pending problem in Many-Body physics that occur in condensed matter systems, nuclear physics, and astrophysics. We have developed a general method to probe with high precision the thermodynamics of locally homogeneous ultracold Bose and Fermi gases [1,2,3]. This method allows stringent tests of recent many-body theories. For attractive spin 1/2 fermions with tunable interaction (^{6}Li), we will show that the gas thermodynamic properties can continuously change from those of weakly interacting Cooper pairs described by Bardeen-Cooper-Schrieffer theory to those of strongly bound molecules undergoing Bose-Einstein condensation. First, we focus on the finite-temperature Equation of State (EoS) of the unpolarized unitary gas. Surprisingly, the low-temperature properties of the strongly interacting normal phase are well described by Fermi liquid theory [4] and we localize the superfluid phase transition. A detailed comparison with theories including Monte-Carlo calculations has revealed some surprises and the Lee-Huang-Yang corrections for low-density bosonic and fermionic superfluids are quantitatively measured for the first time. Despite orders of magnitude difference in density and temperature, our equation of state can be used to describe low density neutron matter such as the outer shell of neutron stars. The equation of state of a strongly interacting ^{7}Li Bose gas has also been measured and showed the universality of the first order beyond mean-field correction [3].

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U. SCHNEIDER

Title: Interacting Fermionic Atoms in Optical Lattices - In- or Out-of-Equilibrium?

Abstract: The last years have seen dramatic progress in the control of quantum gases in optical lattices, which now can serve as a model system for correlated electrons. In the case of fermionic quantum gases it became possible to observe high-temperature equilibrium states ranging from Mott-insulating regimes for strong repulsive interactions over metallic and band-insulating states at weak interactions to pseudogap behavior for attractive interactions. But are these states in global thermal equilibrium?

The possibility to change all relevant parameters in real-time by e.g. varying laser

intensities or magnetic fields has in addition allowed for studies of dynamical behavior and explicit out-of-equilibrium dynamics within the Hubbard model. The observed dynamics show a strong suppression of mass transport for increasing interactions and have profound consequences on all future experiments aiming at the realization of low-temperature many-body states in the lattice.

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G. SHLYAPNIKOV
Title: Novel physics with fermionic polar molecules

Abstract: I will describe a possibility to achieve p_x+ip_y superfluid phase for microwave-dressed polar molecules in the 2D geometry. I then consider a bilayer system of fermionic polar molecules and explain how one can achieve a BCS-BEC crossover (from s-wave interlayer BCS superfluid to BEC of interlayer dimers) and a BCS-BEC phase transition (from p-wave interlayer superfluid to BEC of interlayer dimers).

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A. TURLAPOV
Title: Two-dimensional Fermi gas of atoms

Abstract: 2D Fermi gas of atoms may become a testbed for exploration of low-dimensional collective phenomena. Lower dimensionality alters phase transitions and brings about non-trivial topological properties. I will speak about preparation and observation of a 2D gas of fermionic lithium atoms. The kinematic dimensionality is reduced by trapping the atoms in anti-nodes of a standing wave formed by two counter-propagating laser beams. Each anti-node provides a pancake-shaped confining potential, which “freezes” the motion along the direction of tight confinement. The gas is observed by means of a high-resolution imaging system, which allows for seeing the gas in situ in each individual anti-node. The imaging system is suitable for local thermodynamic measurements.

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M. UEDA

Title: Efimov States in Fermionic Lithium

Abstract: Recent theoretical and experimental efforts to create and understand the Efimov states in a three-component mixture of ^{6}Li are reviewed [1,2]. It is pointed out that the recently observed loss peaks at 602G and 685G [3,4], which are the crossing points of the atom-dimer threshold and the ground and first excited Efimov states, show significant deviations from the universal Efimov theory predictions. The Efimov binding energy, which was observed via radio-frequency association, shows a marked temperature dependence and its temperature-independent part shows significant deviations from nonuniversal theory prediction based on a three-body parameter with a monotonic binding-energy dependence [5,6].

[1] P. Naidon and M. Ueda, Phys. Rev. Lett. 103, 073203 (2009)
[2] P. Naidon and M. Ueda, Comp. Rend. Phys. 12, 13 (2011)
[3] S. Nakajima, et al., Phys. Rev. Lett. 105, 023201 (2010)
[4] T. Lompe, et al., Phys. Rev. Lett. 105, 103201 (2010)
[5] T. Lompe, et al., Science 330, 940 (2010)
[6] S. Nakajima, et al., Phys. Rev. Lett. 106, 143201 (2011)

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C. VALE

Title: Bragg spectroscopic studies of the universal contact in a Fermi gas

Abstract: Strongly interacting gases of fermionic atoms display a number of exact universal properties which can be quantified through a parameter known as the contact. The contact is linked to the high momentum component of the static structure factor and can be measured experimentally via Bragg spectroscopy. In this talk I will present our measurements of the contact in a strongly interacting gas of Li-6 atoms. We have investigated both the interaction and temperature dependence of the contact as well as verifying a universal law for the static structure factor.

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M. ZWIERLEIN
Title: Universal Thermodynamics and Spin Transport in a Strongly Interacting Fermi Gas

Abstract: Phase transitions in fermionic systems are of fundamental importance, as they govern superconductors, magnets, even the formation of matter in the Early Universe. However, strongly interacting fermions still defy exact theoretical modeling. Precision many-body physics with ultracold Fermi gases holds the promise of solving outstanding problems in condensed matter, nuclear and astrophysics. In this talk I will present high-precision measurements on the thermodynamics of a strongly interacting Fermi gas across the superfluid transition down to near-zero entropy. The onset of superfluidity is observed in the temperature dependence of the chemical potential, the entropy, the compressibility and the heat capacity that displays a characteristic lambda-like feature.
I will also discuss our experiments on spin transport in a two-state mixture of fermionic atoms near a Feshbach resonance [1,2]. Starting with two separate spin domains in an atom trap, we observe the subsequent evolution of the spin mixture. Initially, the gas clouds of unlike spins almost perfectly bounce off each other, despite densities a million times thinner than air. At later times the two clouds very slowly diffuse into each other, with a quantum limited diffusion constant D ~ h/m, where m is the atomic mass. The ratio of spin conductivity and spin diffusion coefficient yields the spin susceptibility in these gases, showing the Curie law at high temperatures and a departure from the compressibility at low temperatures, that we interpret as a signature for entering the Fermi liquid regime. Our measurements in and out of equilibrium provide benchmarks for current many-body theories on strongly interacting fermions and have direct implications on the energy density and transport properties of neutron matter.
[1] A. Sommer, M. Ku, M.W. Zwierlein, Spin Transport in Polaronic and Superfluid Fermi Gases. New Journal of Physics, Strongly Correlated Fluids Focus Issue, New J. Phys. 13, 055009 (2011)
[2] A. Sommer, M. Ku, G. Roati, M.W. Zwierlein, Universal Spin Transport in a Strongly Interacting Fermi Gas, Nature, 472, 201 (2011).

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W. ZWERGER

Title: Tan relations, 1D Fermi gases and Stoner Ferromagnetism

The talk provides an introduction to the Tan relations for Fermi gases with effectively zero range interations and their experimentally observable consequences, e.g. in RF spectroscopy. The special case of 1D Fermi gases is discussed together with the issue whether a Stoner type ferromagnetic instability may appear for strongly repulsive gases.

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