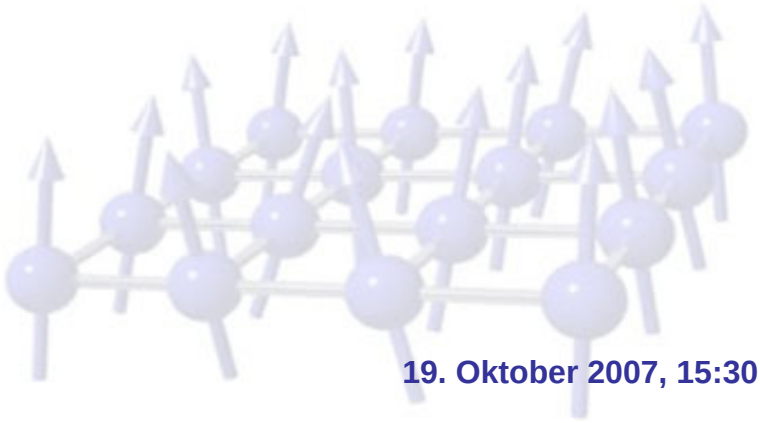
SFB/TRR 21 - Kolloquium
19. Oktober 2007, Stuttgart

Prof. Chris H. Greene
(University of Colorado)

Few-body perspectives on the many-fermion problem: the strongly-interacting limit

One of the intriguing types of dilute quantum gas that is generating extensive current interest is a gas of fermionic atoms. For such a collection of trapped particles that occupy two different spin states, the interaction between them can be increased to infinity by tuning an external magnetic field that causes the two-body scattering length to diverge. This is the so-called BCS-BEC crossover problem, and it has fascinating dynamical possibilities, because one can control magnetically whether the gas is a degenerate Fermi gas, a collection of weakly-coupled BCS Cooper-type pairs, or a Bose-Einstein condensate of diatomic molecules. Such a system has recently been predicted to have some remarkably simple universality properties in this limit of "infinitely strong interactions". This colloquium will present an overview, followed by a discussion of insights gleaned from treating small systems having anywhere from 4 to 30 fermionic atoms.



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Universität Stuttgart, NWZII, Raum 2.136
Pfaffenwaldring 57, 70569 Stuttgart

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