SFB/TRR 21 - Seminar

22. November 2010, Stuttgart

Kaden Hazzard

(JILA, University of Colorado, Boulder, USA)

Exploring the Mott/metal crossover in ultracold alkali and alkaline earth atoms in optical lattices

The recent achievement of quantum degeneracy in alkaline earth atoms opens up new worlds of many-body physics, due to their large nuclear spin degeneracy N, as large as 10. I will discuss this physics for fermions in optical lattices and its connection to important models and states of matter in condensed matter physics, for example, exotic "chiral spin liquids."Reaching sufficiently low temperatures to realize these or other interesting magnetic states has been a serious experimental challenge. Encouragingly, I will show that simply increasing N substantially decreases the final temperature produced by standard experimental protocols, up to a factor of five or more. Finally I will give a simple prescription that can solve open questions regarding the Mott/metal crossover, which has been actively studied since the original descriptions by Mott and Slater. Excitingly, this can be utilized even at present experimental temperatures and with alkali (N=2) gases.

22. November 2010, 14:00 Uhr

Universität Stuttgart, NWZII, Raum 5.331
Pfaffenwaldring 57, 70569 Stuttgart

CO.CO.MAT