Contribution ID: **17** Type: **not specified**

Ultracold atom quantum simulators pass first key test

Thursday 21 February 2013 14:20 (40 minutes)

Ultracold atoms trapped by laser beams make artificial materials which can be engineered with a remarkable level of control and tunability. They provide a unique toolbox for emulating the prototypical models of condensed matter physics. Before they can be trusted as quantum simulators, they need to be checked and validated against known results, for which quantum Monte Carlo simulations are ideally suited. I will give a brief overview of the state of the art of quantum simulation for both ultracold bosonic and fermionic systems, starting with time-of-flight interference patterns and single site resolution techniques. I will proceed with a discussion on recent lattice modulation experiments addressing the possible existence of a well-defined amplitude mode in a strongly-interacting two-dimensional superfluid. This mode is a direct analog of the Higgs boson in particle physics. I will conclude by giving a perspective on future directions in simulating strongly correlated fermionic systems.

Presenter: POLLET, Lode (LMU Munich)