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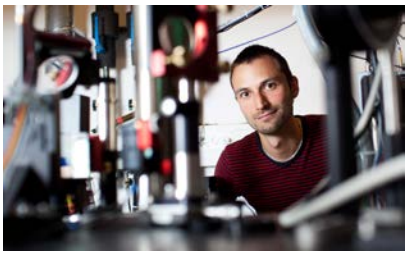
Einladung
zum
Physikalischen Kolloquium

Montag, 13.01.2014
16:15 Uhr in N24/H13



Prof. Dr. Jacob Friis Sherson
Department of Physics and Astronomy
Aarhus University. Denmark

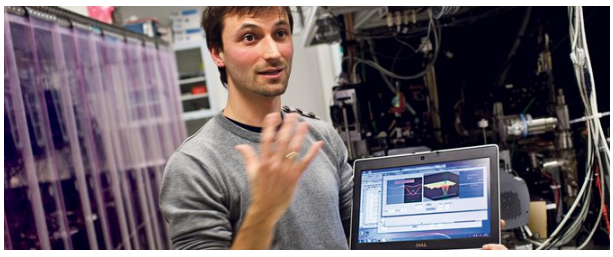
Quantum control of ultracold atoms: a serious game

Progress in the field of quantum technology is hampered by daunting technical and theoretical challenges. Here we present an alternative approach to solving these by enlisting the aid of computer players around the world. We have previously examined a quantum computation architecture involving ultracold atoms in optical lattices and strongly focused tweezers of light [1]. In the online computer game Quantum Moves [2], we have encapsulated the time-dependent Schrödinger equation for the problem in a graphical user interface allowing for easy user input. Players can then search the parameter space with real-time graphical feedback in a game context with a global high-score that rewards short gate times and robustness to experimental errors. The game, which is still in a demo version, has so far been played 150,000 times and we are currently comparing player convergence speeds to those of standard and state-of-the-art optimization algorithms.

Extensions of the approach to other models such as Gross-Pitaevskii and Bose-Hubbard are currently under development. For these, the ultimate goal is to develop a graphical simulation tool that can be used to enhance the innovative process of theoretical and experimental physicists in the field of ultra-cold atoms.

The game has also been incorporated into science education at high-school and university level as an alternative method for teaching quantum mechanics. Initial quantitative evaluation results are very positive.

[1] C. Weitenberg et al, Phys. Rev. A, 84, 032322 (2011)
[2] http://www.scienceathome.org/



Ab 15.45 Uhr Kaffee, Tee und Kekse vor dem Hörsaal H13

Organisation: **Prof. Jelezko** **Tel.: 50-23750**
Hosts: **Prof. Calarco** **Tel.: 50-22832, off 50-22830**