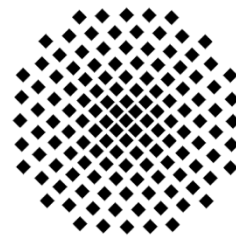


Stuttgarter Physikalisches Kolloquium

Fachbereich Physik, Universität Stuttgart
Max-Planck-Institut für Festkörperforschung
Max-Planck-Institut für Intelligente Systeme

Ansprechpartner: Prof. Harald Giessen
E-Mail: giessen@physik.uni-stuttgart.de
Telefon: 0711 - 685-65111



Dienstag, 30. April 2019

16:15 Uhr

Hörsaal V 57.01

Universität Stuttgart, Pfaffenwaldring 57, 70569 Stuttgart-Vaihingen

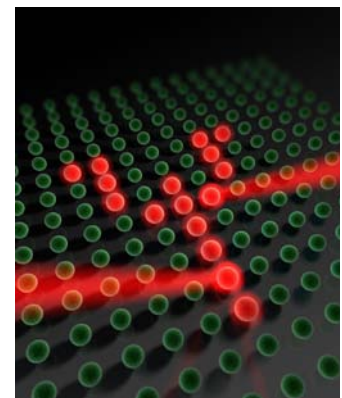
Gastgeber: Prof. Dr. Sebastian Loth, Universität Stuttgart, Telefon: 0711 - 685-65252

Realizing Feynman's Dream of a Quantum Simulator

Immanuel Bloch
MPI für Quantenoptik Garching

Abstract

More than 30 years ago, Richard Feynman outlined his vision of a quantum simulator for carrying out complex calculations on physical problems. Today, his dream is a reality in laboratories around the world. This has become possible by using complex experimental setups of thousands of optical elements, which allow atoms to be cooled to Nanokelvin temperatures, where they almost come to rest.



The atoms can then be trapped and manipulated in arrays of millions of microscopic light traps. Such light crystals allow an unprecedented view into the microscopic world of quantum materials and enable the currently most precise atomic clocks, fundamental to next-generation timing and navigation. In this public lecture, I will explain how such quantum simulators are realized at the lowest temperatures known, and highlight their applications, ranging from condensed-matter and statistical physics to 'table-top' high-energy physics and quantum chemistry.