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Einladung

zum

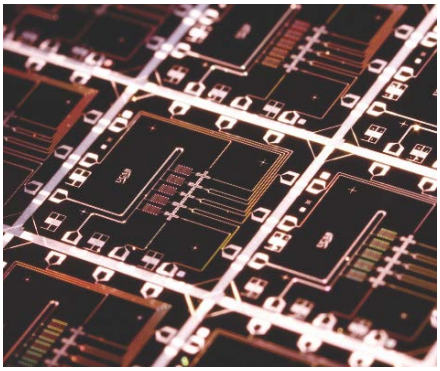
Physikalischen Kolloquium
Montag, 28.11.2016
16:15 Uhr in N24/H13

Professor Dr. Michael J. Hartmann

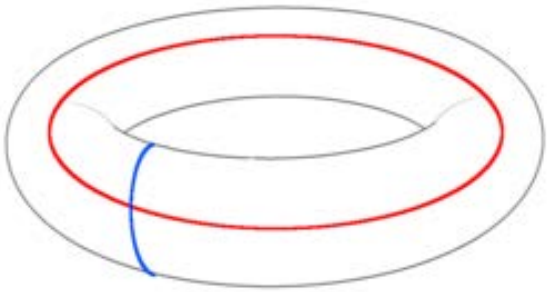
School of Engineering & Physical Sciences
Photonics & Quantum Sciences
Heriot-Watt University, Edinburgh

Quantum Simulations with Superconducting Circuits

Superconducting circuitry has recently become a leading technological platform for quantum engineering and quantum information processing. Such circuit elements are currently assembled in ever larger networks and have thus reached a threshold in their development that opens intriguing perspectives for exploring quantum many-body phenomena. In these quantum simulations, phenomena that are difficult to observe in their natural setting, are experimentally explored on a much more accessible platform.
After reviewing some recent developments in quantum simulations with superconducting circuits, I will in this talk focus on a novel exciting perspective. The objective of emulating quantum many-body phenomena can even be taken further to design quantum matter with new properties that are usually not found in matter as it occurs in nature. With superconducting circuits one can in particular build quantum lattice systems where the kinetic energy or coupling between lattice sites becomes nonlinear. I will discuss how this leads to novel interaction potentials, unconventional currents and specific many-body interactions. The latter give rise to a quantum simulator for the Toric Code, a celebrated lattice model with topological order and applications in quantum error correction.



picture: Martinis Lab, UC Santa Barbara



Ab 16.00 Uhr Kaffee, Tee und Kekse vor dem Hörsaal H13
Organisation: Prof. Dr. F. Jelezko, Tel. 23750, Host: Prof. Dr. S. Huelga, Tel. 22901, off.: 22911