



CRC 1227
Designed Quantum States of Matter



GASTVORTRAG

am 13. Juli 2017, 15:30 Uhr
Leibniz Universität Hannover
Welfengarten 1, 30167 Hannover
Hauptgebäude (1101),
Seminarraum am Institut für Quantenoptik
Raum D326

Vortragender:

Dr. Hannes Bernien,
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Physics, Cambridge
(Guest of Apl. Prof. Dr. Carsten Klempt)

Thema: Quantum many-body dynamics of strongly interacting atom arrays

The realization of large-scale controlled quantum systems is an exciting frontier in modern physical science. In this talk, I will introduce a new platform based on cold atoms in arrays of optical tweezers. We use atom-by-atom assembly to deterministically prepare arrays of individually controlled cold atoms. A measurement and feedback procedure eliminates the entropy associated with the probabilistic trap loading and results in defect-free arrays of over 60 atoms. Strong controllable interactions between these atoms are introduced by exciting them to Rydberg states. The resulting Ising-type interactions lead to entanglement and non-trivial spatial correlations across the array. In particular, we explore adiabatic transitions into crystalline states and study quantum dynamics of this strongly correlated system in the vicinity of a phase transition. Prospects for studying entanglement dynamics in many-body systems and the implementation of quantum algorithms will be discussed.

**Zu dieser Veranstaltung sind alle DQ-mat-Mitglieder und
alle Interessierten herzlich eingeladen.**