PHYSIKALISCHES KOLLOQUIUM

DOUBLE FEATURE:
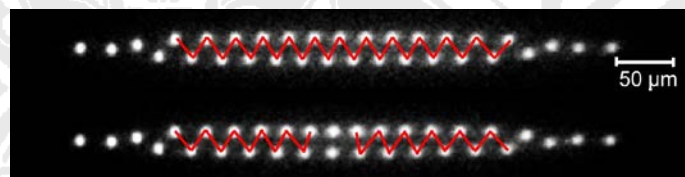## MASTER THESIS LAUREATES OF THE YEAR 2016

AM 12. DEZEMBER 2016 UM 17 UHR C.T. (2 X 25 MINUTEN)

IM GROßEN HÖRSAAL

**17: 15 – 17:45:**

PHILIP KIEFER

Fluorescence images of Magnesium Coulomb crystals. Periodical, two-dimensional zig-zag structure (top), compared to a crystal containing a topological defect (bottom).

TOPOLOGICAL DEFECTS IN COULOMB CRYSTALS

A state of disorder seems to be easily generated. However, during the process of crystallization, for example, a system will seek for perfect order, its configuration of minimal energy. If a phase-transition evolves too fast for information exchange between different sections of the crystal, sub-ensembles find perfect crystalline order, while becoming incommensurate at their common boarders.

17: 45 – 18:15:

KAI VON PRILLWITZ
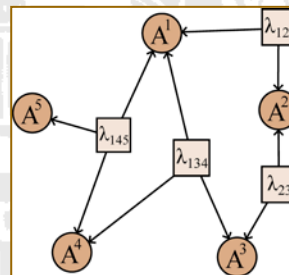
TESTING CAUSAL RELATIONS WITH REAL DATA

The concept of causation, or colloquially 'what causes what', is basic to human thinking and has a long philosophical background. Yet, a solid mathematical theory of causal inference has long been missing. Nowadays, causal relations are often modelled using so called *directed acyclic graphs*, where nodes represent variables and edges can be interpreted as direct causal influence. The graph implies constraints on the probability distribution of its variables. If a probability distribution related to some empirical data violates such a constraint, the underlying causal model can be excluded as an explanation for generating the data. The presentation is about sophisticated constraints for models including non-observable variables, and how hypothesis tests can be constructed in order to decide the compatibility of a causal model and some real data. The methods are applied to a simple data set.

WINE, BREZELS AND BEER WILL COMPLETE THE SYMPOSIUM