



# Innsbruck Physics Colloquium

Dynamics in one dimension: a treasure trove of theoretical and experimental many-body quantum physics

**Jean-Sébastien Caux**

University of Amsterdam



Although we live in a 3-dimensional world, modern experimental methods allow to realize quantum systems in which dynamics is effectively confined to one dimension. In such restricted line-like universes, physics can be very counter-intuitive: particles “melt” into collective modes, relaxation processes are turned off (c.f. the famous Newton’s cradle experiment), and perturbative/Fermi liquid-based intuitions completely fail, leading to much potential for novel (and potentially useful) phenomena.

On the theoretical side, one-dimensionality opens up the possibility of providing exact solutions to models of strongly-interacting quantum matter. In recent years, much progress has been achieved in using such exact methods to characterize the in- and out-of-equilibrium dynamics of low-dimensional systems such as interacting atomic gases and quantum spin chains. This colloquium will provide an accessible introduction to these developments, and highlight interesting open issues and challenges.

**Colloquium: Tuesday, 07.11.2017**

**17:15 h in lecture hall C**

**DK-ALM Pre-Talk 16:30: Martin Hebenstreit**  
***The entanglement Hierarchy of  $2 \times m \times n$  systems***

Snacks will be provided in between the pre-talk and the colloquium.



Der Wissenschaftsfonds.