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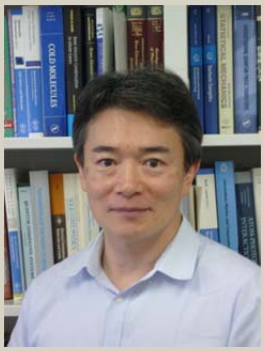
AT THE FOREFRONT OF NANO SCIENCE



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NANOSCIENCE COLLOQUIUM

Thursday
April 7, 2016
at 15:15,
K-space, Fysicum

The Gibbs Paradox and Entanglement Prethermalization in a Bose Gas

An isolated quantum system often shows relaxation to a quasi-stationary state before reaching thermal equilibrium.
Such a prethermalized state was observed in recent experiments in a one-dimensional Bose gas after it is coherently split into two.
While the existence of local conserved quantities is usually considered to be the key ingredient of prethermalization, it has remained elusive whether nonlocal correlations between the subsystems can influence prethermalization of the entire system. We discuss the dynamics of coherently split one-dimensional Bose gases and show that the initial entanglement combined with energy degeneracy due to parity and translation invariance strongly affects the long-time behavior of the system.
The mechanism of this ``entanglement prethermalization'' is quite general and not restricted to the one-dimensional Bose gas.
In view of recent experimental realization of a system involving a small well-defined number of ultracold atoms, our predictions based on exact few-body calculations are amenable to experimental test.

Host: Stephanie Reimann (Mathematical Physics)