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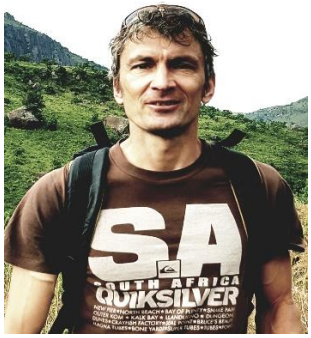
NITheP Colloquium

Monday, 31 August 2020, 16h00

Prof Michael Kastner

NITheP & University of Stellenbosch



Equilibration timescales of isolated quantum systems

Abstract: Equilibration and thermalisation are key concepts in the macroscopic theory of thermodynamics, and there is a long-standing interest in deriving, or at least justifying, equilibration and thermalisation from an underlying microscopic theory, e.g. the Schrödinger equation. Over the past decade or two this line of research has seen substantial progress, in part triggered by advances in quantum information theory. In this talk I introduce and discuss the paradigm shift (from "ergodicity" to "typicality") that led to this progress, I define the notions of equilibration and thermalisation in a suitable probabilistic sense, and I give an overview of the extent to which the equilibration of isolated quantum systems is by now established on microscopic grounds. I conclude the talk with an outlook on ongoing research in my group concerning the timescales on which typical quantum systems reach equilibrium.

Bio: Michael Kastner is a Chief Researcher at the National Institute for Theoretical Physics and a Professor at Stellenbosch University, South Africa, where he is leading a research group on quantum many-body theory and quantum statistical physics. While his work is theoretical, his research draws inspiration from quantum simulation experiments, frequently in collaboration with experimentalists. He holds a PhD from the Friedrich-Alexander-Universität Erlangen (Germany), is the author of 70+ scientific publications, and is a recipient of the research prize of the Emil-Warburg foundation. He is the principal investigator of several grants that support theoretical and experimental efforts in quantum simulation and measurement.

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Time: 16h00