

PHYSIKALISCHES KOLLOQUIUM

Wintersemester 2023/24

Das Kolloquium findet (soweit unten nicht anders angegeben) jeweils montags **jeweils montags um 17:15 Uhr online via Zoom** statt.

(Der jeweilige Link wird noch zur Verfügung gestellt.).

06.11.2023

Prof. Dr. Markus Heyl
Universität Augsburg, Lehrstuhl für Theoretische Physik III

Solving 2D Quantum Matter With Neural Quantum States

Abstract

Neural quantum states have emerged as a novel promising numerical method to solve the quantum many-body problem both in and out of equilibrium. In this talk I will highlight the recent progress in particular concerning correlated quantum matter in two spatial dimensions both for the equilibrium ground-state as well nonequilibrium real-time dynamics problem. For the calculations of ground-states I will introduce the minimum-step stochastic reconfiguration method that reduces the optimization complexity by orders of magnitude. I will show that with this method we can now accurately train on unprecedentedly deep neural quantum states with millions of parameters allowing us to obtain the lowest variational energies as compared to existing numerical results for frustrated quantum magnets. Further, I will highlight the recent results on solving the real-time dynamics of correlated quantum matter using neural quantum states, which has allowed us to verify for instance for the first time the quantum Kibble-Zurek mechanism for interacting quantum many-body systems in two spatial dimensions.

Für die Dozentinnen bzw. Dozenten der Fakultät

Prof. Dr. Assaad, Prof. Dr. Hinrichsen, Prof. Dr. Pflaum und Hr. Kuhr