



ARNOLD SOMMERFELD
CENTER FOR THEORETICAL PHYSICS



Sommerfeld Theory Colloquium

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ASC-PhD-Colloquium: Evolving Tensor Networks

Numerical methods for the study of many-body quantum systems remain at the forefront of research. When confronted with real-world settings, most methods suffer from at least one hard problem, e.g. Fermionic signs, strong correlations, large entanglement, too few or too many dimensions etc.

In this talk, I will showcase some select examples where these difficulties can be overcome for the case of tensor-network methods by algorithmic improvements and careful implementations to allow the successful application to more complex systems.

Specifically, we will first discuss temperature-dependent changes of the excitation spectrum of coupled spin chains where experimental data from neutron scattering can be perfectly reproduced. Secondly, reliable results for the pairing correlator in the 2D Hubbard model away from half-filling have been produced and cross-verified with both the necessary improvements to the tensor network method and the resulting physics examined here.

Finally, we will provide an outlook towards further development of fully two-dimensional tensor network methods suitable for the simulation of large-scale systems.

Wednesday, 14 November 2018, 16:15h, Room A348, Theresienstr. 37 / III