PAUL SCHERRER INSTITUT

PSI

CONDENSED MATTER THEORY SEMINAR

Recent developments in tensor networks

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Tuesday, Apr 30, 2019, 11:00-12:00

WHGA/121 (PSI-West)

Abstract:

In the first half of the talk, I will report on recent progress made in the description of finite-dimensional quantum systems with non-local interactions using tensor network approaches. Such systems include molecular systems of interest in quantum chemistry as well as effective systems arising as the to-be-solved inner problems of the dynamical mean field theory or the density matrix embedding theory. In all cases, using loop-free MPS or tree tensor networks, sufficient progress can be made over standard solvers using exact diagonalisation.

In the second half of the talk I will summarise the relatively novel application of real-time evolution to infinite two-dimensional tensors networks to obtain time-dependent observables. The evolution is applied to the 2D S=1/2 Nel state on the square lattice in a disorder-averaged Hamiltonian where we find hints towards many-body localisation in the spin dynamics as the disorder strength is increased.

References

[1] Teresa E. Reinhard et al., arXiv:1811.00048 (2018)
[2] Sebastian Paeckel et al., arXiv:1901.05824 (2019)
[3] Claudius Hubig, J. Ignacio Cirac, arXiv:1812.03801 (2019)

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