Learning Feynman diagrams with tensor networks

I will discuss our recent efforts to calculate many-body effects within the Keldysh formalism. Our technique combines a systematic expansion in terms of Feynman diagrams with tensor network techniques to calculate the corresponding multi-dimensional integrals. compared to previous approaches based on (diagrammatic) quantum Monte-Carlo sampling, we obtain a convergence that is dramatically faster and also appears to be immune from the difficulties associated with the sign problem.

I will illustrate the technique with calculations for the out-of-equilibrium Anderson problem, showing the emergence of Kondo physics in an interaction quench as well as transport calculations.

https://journals.aps.org/prx/abstract/10.1103/PhysRevX.12.041018

https://journals.aps.org/prx/abstract/10.1103/PhysRevX.9.041008