

Quantum computers and many-body systems

J. Ignacio Cirac

S. Lu and M. C. Bañuls

Max-Planck Institute of Quantum Optics, Hans-Kopfermannstr. 1, Garching, Germany

ignacio.cirac@mpa.mpg.de

Quantum many-body systems are very hard to simulate, as computational resources (time and memory) typically grow exponentially with system size. However, quantum computers or analog quantum simulators may perform that task in a much more efficient way. In this talk, I will review some of the quantum algorithms that have been proposed for this task and then explain the advantages and disadvantages of analog quantum simulators. In particular, I will describe methods to simulate the dynamics, to find ground states, or compute physical properties at finite temperatures.

References

- [1] S. Lu, M.C. Bañuls and J. I. Cirac, PRX Quantum 2, (2021) 020321.

Figures
