

Quantum Calculations: Matrix Product States

Speaker: Barry McFarland

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Note taken by Ron Wu

This wonderful weekend we studied tensor networks. It started from its simplest form: Matrix Product States, then the speaker discussed its use case to numerical simulations of complex many-body systems, quantum gravity (<https://datawarrior.wordpress.com/2016/12/14/tensor-networks-and-density-matrix-renormalization-group/>) and its connection to black hole area law and Ryu-Takayanagi formula from quantum error correction for quantum computing, as well as its connections to deep neural net.

References

- [1] Barry McFarland *Abstract* <https://www.meetup.com/The-NY-Quantum-Theory-Group/events/238256764/>
- [2] Eisert, etc *Entanglement and Tensor Network States* <http://www.cond-mat.de/events/correl13/manuscripts/eisert.pdf>
- [3] Patrick Hayden, *Spacetime, Entropy, and Quantum Information* <https://simons.berkeley.edu/talks/patrick-hayden-2015-05-08>
- [4] Sean Hartnoll, *From Black Holes to Superconductors* <http://events.stanford.edu/events/491/49141/>