Contribution ID: **21** Type: **not specified**

Tensor network from quantum simulations to machine learning

Thursday 14 June 2018 09:00 (1 hour)

Tensor network is both a theoretical and numerical tool, which has achieved great success in many body physics from calculating he thermodynamic property and quantum phase transition to simulations of black holes. As a general form of high dimensional data structure, tensors have been adopted in diverse branches of data analysis, such as in signal and image processing, psychometric, quantum chemistry, biometric, quantum information, back holes, and brain science. Tensor network simulates the interactions between tensors and becomes a developing powerful in these new fields. During recent years, tensor network numerical methods such as matrix product state (MPS) and projected entangled pair state (PEPS) has also finds its way to machine learning. Besides, the physical concept of entanglement offers a new theoretical approach to the design of different neural networks.
For example, we find that graphic models, such as restricted Boltzmann machine (RBM) is equivalent to a specific tensor network and we can study the expression power of the RBM.

Phys. Rev. B 97, 085104 (2018)
arXiv: 1712.04144

Presenter: CHEN, Jing (Flatiron Institute)