Infinite Matrix Product States from Conformal Field Theory

Hong-Hao Tu

MPI Garching, Germany

Matrix Product States (MPS) are variational ansatz underlying the DMRG and well describe 1D gapped systems. For 1D critical systems whose entanglement entropy grows logarithmically with the subsystem size, usual MPS are less accurate due to their finite entanglement.

In this seminar, I will discuss the infinite MPS (iMPS) constructed from conformal field theory. These states are useful for describing both 1D critical models and 2D chiral topological phases. I will illustrate these ideas by presenting a class of iMPS for the $SO(n)_1$ WZW model. In 1D, they belong to the $SO(n)_1$ universality class and their parent Hamiltonians are $SO(n)$ generalizations of Haldane-Shastry models. In 2D, these iMPS are chiral spin liquids and support anyonic excitations. The anyonic properties of these states depend on n mod 16, *i.e.*, the sixteen-fold way proposed by Kitaev.