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Takuya Okuda (Tokyo)

Friday, 21 October 2022 09:00 (50 minutes)

[chair: Jaewon Song (KAIST)]

“Measurement-based quantum simulation of gauge theories”

Numerical simulation of lattice gauge theories is an indispensable tool in high energy physics, and their quantum simulation is expected to become a major application of quantum computers in the future. In this talk, I show that sequential single-qubit measurements with the bases adapted according to the former measurement outcomes can induce a deterministic Hamiltonian quantum simulation of abelian lattice gauge theories. This is a specialization of the so-called measurement-based quantum computation, with a resource state tailored to simulate a lattice gauge theory. The resource state has a symmetry-protected topological order with respect to generalized global symmetries that are related to the symmetries of the simulated gauge theories on the boundary. If time permits I will sketch imaginary-time quantum simulation and the relation of the resource state with the classical partition function. This talk is based on a work in progress with Hiroki Sukeno.