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Quantum advantage pursued by Hamiltonian simulation

Saturday, 27 September 2025 11:55 (40 minutes)

Quantum advantage refers to a computational benefit that quantum processors can achieve, which is unattainable by their classical counterparts. While numerous quantum algorithms have been proposed to demonstrate such an advantage, whether it has truly been achieved remains a subject of ongoing debate. This talk will introduce a Hamiltonian simulation of (1+1)D abelian lattice gauge theory on quantum processors as an alternative yet promising approach toward the quantum advantage. In particular, focusing on two key examples—ground state preparation and excited state spectroscopy—this talk will highlight how challenging physical problems can be addressed through quantum algorithms implemented on quantum hardware.

Presenter: Dr GHIM, Dongwook (IBS-CTPU-PTC)

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