CONDENSED MATTER COLLOQUIUM SERIES

Ankara

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Quantum algorithm to realize and study fractional Hall states and their dynamics on near term quantum computers: A tabletop experiment on near term quantum gravity

February, 13
Tuesday

19:00, *(Ankara Time)*

Click here for zoom link
Meeting ID: 432 931 6595
Password: 326852

Intermediate-scale quantum technologies provide unprecedented opportunities for scientific discoveries while posing the challenge of identifying important problems that can take advantage of them through algorithmic innovations. Fractional Hall systems which are one class of correlated electron systems with many interesting and puzzling properties. In this talk I present an efficient quantum algorithm to generate an equivalent many-body state to Laughlin's $v=1/3$ fractional quantum Hall state on a digitized quantum computer. Our algorithm only uses quantum gates acting on neighboring qubits in a quasi-one-dimensional setting, and its circuit depth is linear in the number of qubits. I then present another quantum algorithm to generate and study out of equilibrium properties of fractional Hall state. Such features reveals novel geometric aspects of fractional Hall states which mimics gravitons.

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