



Colloquium

Coherent motional dynamics in trapped-ion systems

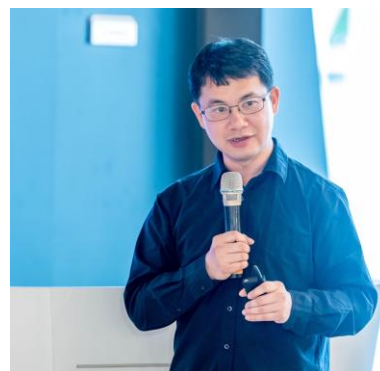
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Date: 2026/10/20 (Tue)

Venue: S4-625

Time: 14:00



Abstract :

The motional degree of freedom plays a central role in trapped-ion systems. While scalable trapped-ion architectures require ions to be transported with minimal motional excitation, motional states themselves also provide a rich playground for quantum control and nonclassical state preparation. In this talk, I will discuss two recent theoretical studies on the coherent manipulation of ion motion. The first explores a fast shuttling protocol based on rapid switching of trapping potentials while preserving motional coherence. The second investigates squeezed phonon lasing, where coherent driving and dissipation combine to generate nonclassical vibrational states with squeezed phonon statistics. These studies highlight how coherent control of ion motion may support future developments in scalable quantum computing, quantum state engineering, and quantum-enhanced sensing.