Contribution ID: **301** Type: **Talk**

【508】Operation of a microfabricated 2D ion trap array

Tuesday, 31 August 2021 18:15 (15 minutes)

We investigate scalable surface ion traps for quantum simulation and quantum computing.
We developed a micro-fabricated surface trap consisting of two parallel linear-trap arrays with 11 trapping sites each.
We demonstrate trapping and shuttling of multiple ions, and form square and triangular ion-lattice configurations with up to six ions.
We characterize stray electric fields and measure ion heating rates between 131(13) and 470(50) phonons/s in several trapping sites[1].
Furthermore, the design of the trap array allows for tuning of the inter-ion distance across the lattice, which we will use to demonstrate motional coupling of ions in neighboring sites.
[1]Philip C. Holz et al., Adv. Quantum Technol. 3.11 (2020)

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Session Classification: Quantum Information and Quantum Computing

Track Classification: Quantum Information and Quantum Computing