Contribution ID: **82** Type: **Poster**

Advancements in the cryogenic apparatus design for trapped ion quantum computing within the ATIQ project

Tuesday 9 July 2024 17:06 (2 minutes)

Trapped-ion quantum systems are promising candidates for future quantum computing applications. Further advancements in scalability, reliability, and improved gate fidelity are of utmost importance. In the ATIQ consortium, we enhance our cryogenic apparatus design by transitioning to 43Ca+ as our logical qubit ion. This shift will pave the way for integrating waveguides into our existing trap architecture. Since the alignment of laser beams and the quantization axis defined by the magnetic bias field are paramount, a new tiltable magnetic field array was designed to ensure optimal alignment.
Additional advancements include a novel integration of the trap chip via a socket. By circumventing the limitations imposed by traditional gold wire bonds, we open up new possibilities. Specifically, this approach enables higher-density direct current (DC) connections and facilitates more sophisticated chip layouts.
Within the consortium, the new compiler will be incorporated, bridging the gap between higher-level algorithm languages (such as Qiskit) and the common ARTIQ experiment control code, thereby enabling broader access to quantum computing demonstrators.

Author: POOTZ, Tobias

Co-authors: TORKZABAN, Celeste (Leibniz Universitaet Hannover (DE)); OSPELKAUS, Christian (Leibniz Universitaet Hannover (DE)); STUHRMANN, David Christoph (Insitut für Quantenoptik, Leibniz Universität Hannover); KILZER, Lukas; GOYAL, Radhika

Presenter: POOTZ, Tobias

Session Classification: Poster session

Track Classification: Quantum Information & Computing