



## Towards strong coupling in an ion-trap fiber-cavity apparatus

Klemens Schueppert<sup>1</sup>, Florian Ong<sup>1</sup>, Bernardo Casabone<sup>1</sup>, Konstantin Friebe<sup>1</sup>, Konstantin Ott<sup>2</sup>, Jakob Reichel<sup>2</sup>, Rainer Blatt<sup>1,3</sup> and Tracy Northup<sup>1</sup>

<sup>1</sup> Institute of Experimental Physics, University Innsbruck, Technikerstraße 25, A-6020 Innsbruck, Austria

<sup>2</sup> Laboratoire Kastler Brossel, ENS / UPMC-Paris 6 / CNRS, 24 rue Lhomond, 75005 Paris, France

<sup>3</sup> Institute of Quantum Optics and Quantum Information, Austrian Academy of Sciences

With atoms coupled to optical cavities it is possible to build up quantum interfaces between stationary and flying qubits. A quantum network based on these interfaces offers a compelling solution to the challenge of scalability in quantum computing. By using fiber-based cavities, we expect to reach the strong coupling regime of cavity quantum electrodynamics with single ions.

To that end, we further developed the laser ablation of fiber facets and produced them in a collaboration with the group of Jakob Reichel. The fiber facets are then coated to produce high-finesse fiber mirrors. Specifically, we plan to produce cavities of about 8  $\mu\text{m}$  mode waist and 500  $\mu\text{m}$  in length for use in our integrated ion-trap cavity setup. In parallel, we are currently building a new miniaturized calcium ion trap in the “Innsbruck” linear design.

**Primary author:** SCHUEPPERT, Klemens (UIBK)

**Presenter:** SCHUEPPERT, Klemens (UIBK)