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JOHANNES GUTENBERG UNIVERSITÄT MAINZ

Seminar über Quanten-, Atom- und Neutronenphysik (QUANTUM)

Nov. 12, 2020 at 2 p.m. c.t.
None

Univ.-Prof. Dr. Tracy E. Northup
Universität Innsbruck

Trapped-ion interfaces for quantum networks

Future quantum networks offer a route to quantum-secure communication, distributed quantum computing, and quantum-enhanced sensing. A current challenge across all experimental platforms is how to move beyond proof-of-principle realizations to the efficient, faithful distribution of quantum states over scalable networks. I will present ongoing work on nodes for quantum networks based on trapped ions in optical cavities, focusing in particular on a connection between remote trapped-ion systems in Innsbruck and the development of fiber-cavity-based interfaces.

To conclude, we will consider another role for ions coupled to optical cavities, namely, how they may enable the preparation of macroscopic quantum states of motion, in this case, of levitated nanoparticles. A common theme in this talk will be how an optical cavity can serve as an interface between quantum states encoded in light, in motion, and in the electronic states of an ion.

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