

Hartmut Häffner

University of California, Berkeley

*Coherent Control of Rotating Ion Strings:
Towards Observing Quantum Statistics in a New Regime*

Typically, the bosonic or fermionic nature of indistinguishable particles is either relevant at atomic scales or when the wavefunctions of the particles overlap. Two ions in an ion string, however, are always separated by several micrometers making it natural to identify them as individual particles. In order to demonstrate that the two ions may need to be treated as the same, we plan to interfere an ion string with itself rotated by 180 degrees. In view of this goal, we prepare ion strings rotating with angular momenta of about $7,500 \pm 30$ quanta. The fast rotation allows for coherent control of the rotational degree-of-freedom making it possible to interfere the ion string with its rotated version.