

Shuttling and merging of mixed-species ion chains

Tuesday 4 July 2023 21:00 (2 hours)

I will describe work performed on a Paul trap where we have demonstrated splitting and merging of mixed-species ion chains containing beryllium and calcium ions. These have a large mass ratio of > 4 , which presents a number of complications, including decoupling of motional modes and large differences in mode frequencies, which primarily result from the difference in pseudo potential confinement arising from the radio-frequency trapping fields. We have recently investigated and overcome a number of problems arising from these, and demonstrated the splitting of two-ion Ca-Be chains with only a few quanta of motional excitation. Although these species were chosen for quantum information purposes, the methods are relevant to re-configuration of ion chains of other species, which may be of relevance for spectroscopy of exotic species using quantum logic spectroscopy.

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