Abstract Submitted
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Towards a field-free junction for a network of radio-frequency surface electrode ion traps[1] R. JÖRDENS, U. WARRING, National Institute of Standards and Technology, USA, R. SCHMIED, University of Basel, Switzerland, D.L. MOEHRING, M.G. BLAIN, Sandia National Laboratories, USA, D. LEIBFRIED, D.J. WINELAND, National Institute of Standards and Technology, USA — Intersections between transport guides in a network of RF ion traps are a key ingredient to many implementations of scalable quantum information processing with trapped ions. Several junction architectures demonstrated so far are limited by varying radial secular frequencies, a reduced trap depth, or a non-vanishing RF field along the transport channel. The later induces micromotion which can lead to motional heating. RF-field-free junctions have been proposed for 3D electrode geometries but cannot be easily microfabricated in a scalable way. We report on the design and progress in implementing a configurable microfabricated surface electrode Y-junction that employs switchable RF electrodes. An essentially RF-field-free pseudopotential guide between any two legs of the junction can be established by applying RF potential to a suitable pair of electrodes. The transport channel's height above the electrodes, its depth and radial curvature are constant to within 15%.

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