Simulations of ion transport in T-shaped RF-Paul traps JAMES RABCHUK, JACOB BURRESS[1], Western Illinois University — Trapped Ion Quantum computers will require some or all of the ions involved in large-scale computations to be transported from trapping region to region. In particular, ions would need to be transported around corners. These ions must be moved deterministically without introducing any heating of the ions or unknown phase shifts in their internal, qubit states. The transfer rate of ions in a standard linear trap is limited by the allowed switching speeds of the electrode potentials. We have developed a classical model for predicting the ion motion for a given sequence of electrode potentials that results in deterministic transport of an ion from one trapping region to another. This model has been used to examine ion transport around the corner of T-shaped traps. We have also simulated the trapping, and then separation, of two ions in a T-shaped trap.

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