

Abstract Submitted  
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**A scalable monolithic ion trap in three-dimensional geometry** YE WANG, KIHWAN KIM, Center for Quantum Information, Institute for Interdisciplinary Information Sciences, Tsinghua University, Beijing 100084, P. R. China — We develop a three-dimensional monolithic ion trap that will have a deep trap potential and can be extended to contain multiple zones similar to two-dimensional surface traps. The trap will be fabricated by gold coating on a laser-machined alumina plate which has been successfully used for trapping ions. The basic structure of the trap is analogous to the combination of the three-layer trap [1] and the symmetric trap [2], but the post-processing assembly of multi-layers is not required. On a single layer of alumina plate, we implement RF electrode and twenty DC electrodes. Our trap is expected to demonstrate high radial trap frequency and is able to produce a uniformly spaced ion chain. Furthermore, the technology can be extended to implement a junction structure on the trap to transport ions for connecting different trap zones. This work was supported by the National Basic Research Program of China Grant 11CBA00300, 2011CBA00301, 2011CBA00302, the National Natural Science Foundation of China Grant 61073174, 61033001, 61061130540. KK acknowledges the support from the Thousand Young Talents program.

[1] W. K. Hensinger, et al., Appl. Phys. Lett. 88, 034101 (2006).

[2] F. Shaikh, et al., arXiv:1105.4909.

Ye Wang  
Center for Quantum Information, Institute for Interdisciplinary  
Information Sciences, Tsinghua University, Beijing 100084, P. R. China

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