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A Graphene-Coated Ion Trap for Electric Field Noise Suppression AMIRA ELTONY, HYESUNG PARK, SHANNON WANG, JING KONG, ISAAC CHUANG, Massachusetts Institute of Technology — Trapped ions have proven to be effective quantum bits; but increasing electric field noise as traps are miniaturized limits gate fidelity and progress towards a large-scale quantum computer. Removing contamination from surfaces is important for noise suppression; but cleaning techniques like argon ion bombardment are difficult to integrate with current systems and are too harsh for traps incorporating optical devices. We investigate an alternative solution: a protective coating against surface contamination. We fabricate copper traps with a graphene passivation layer and characterize them with single ions. Surprisingly, we find worse noise performance than for an uncoated metal trap.

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