Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Fault tolerant quantum random number generator certified by Majorana fermions[1] DONG-LING DENG, LU-MING DUAN, Department of Physics, University of Michigan, Ann Arbor — Braiding of Majorana fermions gives accurate topological quantum operations that are intrinsically robust to noise and imperfection, providing a natural method to realize fault-tolerant quantum information processing. Unfortunately, it is known that braiding of Majorana fermions is not sufficient for implementation of universal quantum computation. Here we show that topological manipulation of Majorana fermions provides the full set of operations required to generate random numbers by way of quantum mechanics and to certify its genuine randomness through violation of a multipartite Bell inequality. The result opens a new perspective to apply Majorana fermions for robust generation of certified random numbers, which has important applications in cryptography and other related areas.

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Date submitted: 19 Dec 2012   Electronic form version 1.4