

Abstract Submitted  
for the MAR13 Meeting of  
The American Physical Society

**Quantum simulations of neutrino oscillations and the Majorana equation**<sup>1</sup> CHANGSUK NOH, Center for Quantum Technologies, NUS, BLAS RODRIGUEZ-LARA, Instituto Nacional de Astrofisica, Optica y Electronica, Coordinación de Óptica, DIMITRIS ANGELAKIS, Science Department, Technical University of Crete and Center for Quantum Technologies, NUS — Two recent works on quantum simulations of relativistic equations are presented. The first is on neutrino oscillations with trapped ions as a generalization of Dirac equation simulation in 1 spatial dimension. It is shown that with two or more ion qubits it is possible to mimic the flavour oscillations of neutrinos. The second part is on quantum simulations of the Majorana equation based on the earlier work by Casanova et al. (PRX 1, 021018). We show that by decoupling the equation, it is possible to simulate with a smaller number of qubits given that one can perform complete tomography, including the spatial degrees of freedom.

<sup>1</sup>We acknowledge the financial support by the National Research Foundation and Ministry of Education, Singapore.

Changsuk Noh  
Center for Quantum Technologies, NUS

Date submitted: 27 Nov 2012

Electronic form version 1.4