

Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Protected Josephson Rhombi Chains¹ MATTHEW BELL, JOSH PARAMANANDAM, LEV IOFFE, MICHAEL GERSHENSON, Rutgers University — We have studied the low-energy excitations in a minimalistic protected Josephson circuit which contains two basic elements (rhombi) characterized by the π periodicity of the Josephson energy. The novel design of these elements, which reduces their sensitivity to the offset charge fluctuations, has been employed. We have observed that the lifetime T_1 of the first excited state of this quantum circuit in the protected regime is increased by up to $70\mu\text{s}$, a factor of ~ 100 longer than that in the unprotected state. The decay quality factor $\omega_{01}T_1$ of this qubit exceeds 10^6 . Our results are in agreement with theoretical expectations; they demonstrate the feasibility of symmetry protection in rhombi-based qubits fabricated with existing technology.

¹Templeton Foundation, NSF, and ARO

Matthew Bell
Rutgers University

Date submitted: 15 Nov 2013

Electronic form version 1.4