

Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Three coupled qubits in a single superconducting quantum circuit¹ MADHAVI CHAND, SUMAN KUNDU, N. NEHRA, COSMIC RAJ, TANAY ROY, A. RANADIVE, MEGHAN P. PATANKAR, R. VIJAY, Tata Institute of Fundamental Research, Mumbai 400005 — We propose a new design for a 3-qubit system in the 3D circuit QED architecture. Our design exploits the geometrical symmetry of a single superconducting circuit with three degrees of freedom to generate three coupled qubits. However, only one of these is strongly coupled to the environment while the other two are protected from the Purcell effect. Nevertheless, all three qubits can be measured using the standard dispersive technique. We will present preliminary data on this circuit showing evidence of three distinct qubits that retain the essential properties of a 3D transmon, namely insensitivity to charge noise, sufficient anharmonicity and good coherence times. We will also characterize the coupling of the three qubits to each other, to the environment and to a neighboring transmon qubit. Finally, we will compare our design to previous multi-qubit circuits and discuss possible applications in quantum computing and quantum simulations.

¹Funding: Department of Atomic Energy, Govt. of India; Department of Science and Technology, Govt. of India

Madhavi Chand
Tata Institute of Fundamental Research, Mumbai 400005

Date submitted: 06 Nov 2015

Electronic form version 1.4