Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

**Implementation of all-microwave entanglement schemes in 3D transmon two qubit system** YONUK CHONG, Korea Research Institute of Standards and Science, University of Science and Technology, TAEWAN NOH, Korea Research Institute of Standards and Science, GWANYEOL PARK, Korea Research Institute of Standards and Science, Korea University Sejong Campus, GAHYUN CHOI, Korea Research Institute of Standards and Science, Ulsan National Institute of Science and Technology, JIMAN CHOI, Korea Research Institute of Standards and Science, University of Science and Technology, WOON SONG, Korea Research Institute of Standards and Science, SOON GUL LEE, Korea University Sejong Campus, GIBOG PARK, Ulsan National Institute of Science and Technology — We implemented all-microwave two qubit entanglement scheme via Stark shift-induced controlled phase gate, as suggested by J. Chow et al., [1]. Our system consists of two superconducting transmon qubits, one of which is a tunable-frequency qubit and the other is a fixed-frequency qubit, embedded in a three dimensional copper cavity. As we align higher quantum states outside the computational states, i.e., |12>and |03>, we could achieve controlled phase gate by applying a microwave tone which induces the Stark shift. The gate time can be controlled depending on how close we align the levels. We will present our results on the estimation of the fidelity of generated Bell states with tomographic reconstruction of the two-qubit states as a function of the gate time. [1] J. Chow et al., New J. Phys. 15, 115012 (2013).

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Date submitted: 20 Nov 2016 Electronic form version 1.4