Abstract Submitted
for the DAMOP14 Meeting of
The American Physical Society

**The experimental study on Fock states thermalization in a trapped ion system** YAO LU, SHUOMING AN, MARK UM, DINGSHUN LV, KIHWAN KIM, Center for Quantum Information, Institute for Interdisciplinary Information Science, Tsinghua University, Beijing, China — We report on the experimental study about the thermalization process of phonon number Fock states in a trapped ion system. Heating in the system disturbs a prepared motional quantum state and leads to a thermal distribution. It is believed that heating is caused by electric field fluctuation from the trap electrodes. In experiment, we prepare a Fock State n and wait for a certain amount of time, then measure the phonon distribution by applying the standard red and blue sideband transition and analyzing the interference pattern from different frequencies of Rabi oscillation depending on motional quantum number. The measured heating dynamics is well described by master equation, where a single atom is coupled to a thermal reservoir. This work was supported in part by the National Basic Research Program of China Grant 2011CBA00300, 2011CBA00301, 2011CBA00302, the National Natural Science Foundation of China Grant 61073174, 61033001, 61361136003. KK acknowledges the support from the Thousand Young Talents program.

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Date submitted: 29 Jan 2014 Electronic form version 1.4