Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

**Quantum Coherence and Population Transfer in a Driven Cascade Three-Level Artificial Atom** SUNG UN CHO[1], BK21 Plus Frontier Physics Research Division, Department of Physics and Astronomy, Seoul National University, Seoul 151-747, Korea, HAN SEB MOON, Department of Physics, Pusan National University, Busan 609-735, Korea, YOUNG-TAK CHOUGH, Department of Healthcare & Medical Technology, Gwangju University, 503-703, Korea, MYUNG-HO BAE, NAM KIM, Korea Research Institute of Standards and Science, Daejeon 305-340, Korea — We present an experimental investigation on the spectral characteristics of an artificial atom "transmon qubit" constituting a three-level cascade system (Ξ-system) in the presence of a pair of external driving fields. We observe two different types of Autler-Townes (AT) splitting: Type I, where the phenomenon of two-photon resonance tends to diminish as the coupling field strength increases, and Type II, where this phenomenon mostly stays constant. We find that the types are determined by the cooperative effect of the decay rates and the field strengths. Theoretically analyzing the density matrix elements in the weak field limit where AT effect is suppressed, we single out events of pure two-photon coherence occurring owing to constructive quantum interference.

[1]Korea Research Institute of Standards and Science, Daejeon 305-340, Korea

Sung Un Cho
BK21 Plus Frontier Physics Research Division,
Department of Physics and Astronomy,
Seoul National University, Seoul 151-747, Korea

Date submitted: 09 Jan 2014 Electronic form version 1.4