

Abstract Submitted
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Quantum state collapse and revival under the anti-Jaynes-Cummings model DINGSHUN LV, SHUOMING AN, MARK UM, JUNHUA ZHANG, JINGNING ZHANG, Center for Quantum Information, IIIS, Tsinghua University, Beijing, P. R. China, M.S. KIM, QOLS, Blackett Laboratory, Imperial College London, UK, KIHWAN KIM, Center for Quantum Information, IIIS, Tsinghua University, Beijing, P. R. China, CENTER FOR QUANTUM INFORMATION, IIIS, TSINGHUA UNIVERSITY TEAM — We study the evolution of a coherent state of phonon mode by anti-Jaynes-Cummings (AJC) interaction in a trapped 171Yb^+ ion system. We observe the quantum collapse and revival phenomena by measuring its Q function at the several time intervals [1]. We measure the Q-function by detecting the probability in the vacuum state through the conventional arithmetic subtraction [2]. We also measure the corresponding Wigner function, and observe the negativity, which clearly shows non-classical state emergence during the AJC dynamic evolution. On top of the standard AJC evolution, we introduce an additional phase or Jaynes-Cummings (JC) coupling and control and reverse the dynamics. This work was supported by the National Basic Research Program of China under Grants No. 2011CBA00300 (No. 2011CBA00301), the National Natural Science Foundation of China 11374178. M.S. Kim was supported by the UK EPSRC and Royal Society Wolfson Merit Award.

[1] Miller C A, et al., Phys. Rev. A 46, 4323 (1992).

[2] Mark Um, et al., submitted.

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