

Abstract Submitted
for the DAMOP15 Meeting of
The American Physical Society

Experimental measurement of n-time correlation functions in a trapped ion¹ SHUAINING ZHANG, YANGCHAO SHEN, JIN-NING ZHANG, MAN-HONG YUNG, Center for Quantum Information, IIIS, Tsinghua Univeristy, J.S. PEDERNALES, LUCAS LAMATA, Department of Physical Chemistry, University of the Basque Country UPV/EHU, Bilbao, Spain, J. CASANOVA, Center for Quantum Information, IIIS, Tsinghua Univeristy, ENRIQUE SOLANO, Department of Physical Chemistry, University of the Basque Country UPV/EHU, Bilbao, Spain, KIHWAN KIM, Center for Quantum Information, IIIS, Tsinghua Univeristy — We implement an algorithm to measure n-time correlation functions of the motional degree of freedom of a trapped $^{171}\text{Yb}^+$ ion by following the proposal in Ref. [1]. The algorithm requires a system undergoing a time evolution and an ancillary qubit on which we perform conditional gates. We measure bosonic field correlations such as $g^{(1)}$ and $g^{(2)}$ functions. For the case of an electromagnetic field, $g^{(1)}$ and $g^{(2)}$ are well known in quantum optics as electric field and intensity correlation functions, respectively. This scheme can be extended to a system including also spins and used to characterize relevant physical magnitudes, such as linear response functions.

[1] J. S. Pedernales, et al., Phys. Rev. Lett. 113, 020505 (2014).

¹This 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.

Shen Yangchao
Center for Quantum Information, IIIS, Tsinghua Univeristy

Date submitted: 31 Jan 2015

Electronic form version 1.4