

Abstract Submitted
for the DAMOP16 Meeting of
The American Physical Society

Trapped ion simulation of molecular spectrum¹ YANGCHAO SHEN, YAO LU, KUAN ZHANG, SHUAINING ZHANG, Center for Quantum Information, IIS, Tsinghua University, Beijing, P. R. China, JOONSUK HUH, Mueunjae Institute for Chemistry, Department of Chemistry, POSTECH, Pohang, Korea, KIHWAN KIM, Center for Quantum Information, IIS, Tsinghua University, Beijing, P. R. China — Boson sampling had been suggested as a classically intractable and quantum mechanically manageable problem via computational complexity theory arguments [1]. Recently, Huh and co-workers [2] proposed theoretically a modified version of boson sampling, which is designed to simulate a molecular problem, as a practical application. Here, we report the experimental implementation of the theoretical proposal with a trapped ion system. As a first demonstration, we perform the quantum simulation of molecular vibronic profile of SO₂, which incorporates squeezing, rotation and coherent displacements operations, and the collective projection measurement on phonon modes. [1] S. Aaronson, A. Arkhipov, STOC 11, 333 (2011). [2] Joonsuk Huh. et al. Nature Photon. 9, 615 (2015).

¹This work was supported by the National Basic Research Program of China 11CBA00300, 2011CBA00301, National Natural Science Foundation of China 11374178, 11574002. Basic Science Research Program of Korea NRF-2015R1A6A3A04059773.

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Date submitted: 28 Jan 2016

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