

Abstract Submitted  
for the MAR17 Meeting of  
The American Physical Society

**Provable classically intractable sampling with measurement-based computation in constant time**<sup>1</sup> STEPHEN SANDERS, JACOB MILLER, AKIMASA MIYAKE, Univ of New Mexico — We present a constant-time measurement-based quantum computation (MQC) protocol to perform a classically intractable sampling problem. We sample from the output probability distribution of a subclass of the instantaneous quantum polynomial time circuits introduced by Bremner, Montanaro and Shepherd. In contrast with the usual circuit model, our MQC implementation includes additional randomness due to byproduct operators associated with the computation. Despite this additional randomness we show that our sampling task cannot be efficiently simulated by a classical computer. We extend previous results to verify the quantum supremacy of our sampling protocol efficiently using only single-qubit Pauli measurements.

<sup>1</sup>Center for Quantum Information and Control, Department of Physics and Astronomy, University of New Mexico, Albuquerque, NM 87131, USA

Stephen Sanders  
Univ of New Mexico

Date submitted: 13 Nov 2016

Electronic form version 1.4