

Abstract Submitted
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Using the unitary coupled cluster ansatz for state preparation on a quantum computer LUOGEN XU, Georgetown University, JOSEPH LEE, Columbia University, JIA CHEN, HAI-PING CHENG, University of Florida, BRIAN ROST, Georgetown University, BARBARA JONES, IBM, JAMES FREDERICKS, Georgetown University — The unitary coupled-cluster ansatz is simple to implement in a factorized form on quantum computers. Instead of focusing on variational quantum eigensolvers in this work, we focus on using the unitary coupled-cluster as a tool for ground-state preparation to enable further quantum computation. As an example, we prepare the ground state of a Hydrogen molecule in a minimal basis and illustrate how to use it to determine the "vertical" ionization potential. We deploy this approach on current IBM hardware and discuss how well it works on NISQ machines. If available at the time of the talk, we will also illustrate results for larger basis sets too.

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