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Warm-starting chemistry calculations on quantum computers

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Near-term quantum computers have been proposed as a possible means to explore new chemistry. However, one of the obstacles for feasible near-term quantum advantage in chemistry is the large number of classical parameters that need to be optimized. We analyze the implementation of a quantum computational warm-start approach, inspired by conventional computational methods, for potential energy surface calculations. We find that the warm-start approach can offer a significant speedup as compared to a Hartree-Fock initial state in the absence of noise, while the presence of noise significantly reduces the measured speedup.