

(Mini-colloques: PMQ30) Variational methods for strongly-correlated systems: Can quantum computers boost classical computers? (Oral)

A Chemistry Inspired Error Mitigation Strategy for Variational Quantum Eigensolver Calculations

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Decoherence and gate errors are major challenges for current and near-term quantum computers, and hinder quantum advantage over conventional computers [1]. This presentation outlines a chemistry inspired strategy for mitigating quantum hardware-errors affecting the Variational Quantum Eigensolver algorithm. The strategy can be easily implemented on low-depth quantum circuits and requires only one additional measurement followed by minimal post-processing. Application of this mitigation strategy is exemplified for small molecules such as H₂ and HeH⁺ and for varying levels of noise. The presented strategy can be applied in parallel with measurement error mitigation procedures, and offers an advantage for treating chemical problems on both current and near-term devices.

[1] Yudong Cao, *et al.* Quantum Chemistry in the Age of Quantum Computing. *Chemical Reviews*, 119(19):10856–10915, 10 2019.