Author	Richard Murdoch Montgomery
Affiliation	Scottish Science Society, Edinburgh, Scotland
Review Date	16 January 2026
Reviewer Expertise	Computational methods, machine learning applications in physical sciences

Category	Summary
Review Model	Single-blind peer review for average periodical; assessed against criteria of technical accuracy, clarity, originality, appropriate scope, and citation standards
Article Type	Review article (pedagogical)
Scope	Variational quantum algorithms for molecular simulation: error mitigation (ZNE, PEC, symmetry verification), excited state methods (VQD, SSVQE, qEOM), and embedding techniques (DMET, DFT embedding)

Finding Category	Issues Identified
Technical Errors	Figure 3 y-axis scaling physically implausible (0 to −100 Ha for small molecules); Python code truncated/non-functional
Citation Gaps	Missing references for: 24-fold dZNE error reduction, 50% sample reduction claims, Diels-Alder VQE results, hardware roadmap projections
Structural Issues	Abstract exceeds typical length; section numbering inconsistent; code belongs in supplementary material
Omissions	No discussion of tensor network competitors (DMRG); barren plateau mitigation strategies absent; noise models unspecified; measurement overhead not quantified
Typographical	6 instances of missing spaces after commas; inconsistent hyphenation

Strengths	Weaknesses
Comprehensive integration of three research frontiers	Several uncited quantitative claims
Clear mathematical development with explicit notation	Figure 3 contains apparent error
Balanced, non-hyperbolic assessment of field status	Incomplete Python implementation
Pedagogically valuable for non-specialists	Missing comparison with tensor network methods
Working code example included	Benchmark results lack methodological detail

Verdict	Accept with Minor Revisions