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DAFTAR PUSTAKA

Abrams, D. S. dan Lloyd, S., 1999. Quantum algorithm providing exponential speed increase for finding eigenvalues and eigenvectors, *Physical Review Letters*, 83(24), p. 5162.

Anderson, P. W., 1973. Resonating valence bonds: A new kind of insulator?, *Materials Research Bulletin*, 8(2), p. 153–160.

Anderson, P. W., 1987. The resonating valence bond state in la2cuo4 and superconductivity, *science*, 235(4793), p. 1196–1198.

Arute, F., Arya, K., Babbush, R., Bacon, D., Bardin, J. C., Barends, R., Biswas, R., Boixo, S., Brandao, F. G., Buell, D. A. dkk., 2019. Quantum supremacy using a programmable superconducting processor, *nature*, 574(7779), p. 505–510.

Aspuru-Guzik, A., Dutoi, A. D., Love, P. J. dan Head-Gordon, M., 2005. Simulated quantum computation of molecular energies, *Science*, 309(5741), p. 1704–1707.

Balents, L., 2010. Spin liquids in frustrated magnets, *nature*, 464(7286), p. 199–208.

Beckey, J. L., Cerezo, M., Sone, A. dan Coles, P. J., 2022. Variational quantum algorithm for estimating the quantum fisher information, *Physical Review Research*, 4(1), p. 013083.

Cerezo, M., Arrasmith, A., Babbush, R., Benjamin, S. C., Endo, S., Fujii, K., McClean, J. R., Mitarai, K., Yuan, X., Cincio, L. dkk., 2021. Variational quantum algorithms, *Nature Reviews Physics*, 3(9), p. 625–644.

Feynman, R. P., 1982. Simulating physics with computers, *Int. J. Theor. Phys.*, 21, p. 467–488.

Griffiths, D. J. dan Schroeter, D. F., 2018. *Introduction to Quantum Mechanics*, 3 edn, Cambridge University Press.

Helgaker, T., Jørgensen, P. dan Olsen, J., 2014. Molecular electronic-structure theory, , .

IBM Quantum, 2022. Ibm quantum science open prize 2022, `https://www.ibm.com/quantum/blog/ibm-quantum-open-science-prize-2022`. Accessed: 2026-01-21.

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IBM Quantum, 2025. Variational quantum eigensolver (vqe), `https://quantum.cloud.ibm.com/learning/en/modules/computer-science/vqe`. IBM Quantum Learning. Accessed: 15 July 2026.

Kandala, A., Mezzacapo, A., Temme, K., Takita, M., Brink, M., Chow, J. M. dan Gambetta, J. M., 2017. Hardware-efficient variational quantum eigensolver for small molecules and quantum magnets, *nature*, 549(7671), p. 242–246.

Kingma, D. P. dan Ba, J., 2014. Adam: A method for stochastic optimization, *CoRR*, abs/1412.6980.
URL: *https://api.semanticscholar.org/CorpusID:6628106*

Kitaev, A. Y., 1995. Quantum measurements and the abelian stabilizer problem, *arXiv preprint quant-ph/9511026*, .

Manin, Y., 1980. Computable and uncomputable, *Sovetskoye Radio, Moscow*, 128, p. 28.

McClean, J. R., Boixo, S., Smelyanskiy, V. N., Babbush, R. dan Neven, H., 2018. Barren plateaus in quantum neural network training landscapes, *Nature communications*, 9(1), p. 4812.

McClean, J. R., Romero, J., Babbush, R. dan Aspuru-Guzik, A., 2016. The theory of variational hybrid quantum-classical algorithms, *New Journal of Physics*, 18(2), p. 023023.

Nielsen, M. A. dan Chuang, I. L., 2010. *Quantum computation and quantum information*, Cambridge university press.

Peruzzo, A., McClean, J., Shadbolt, P., Yung, M.-H., Zhou, X.-Q., Love, P. J., Aspuru-Guzik, A. dan O'brien, J. L., 2014. A variational eigenvalue solver on a photonic quantum processor, *Nature communications*, 5(1), p. 4213.

Preskill, J., 2018. Quantum computing in the nisq era and beyond, *Quantum*, 2, p. 79.

Preskill, J., 2023. Quantum computing 40 years later, *Feynman Lectures on Computation*, CRC Press, pp. 193–244.

Seki, K., Shirakawa, T. dan Yunoki, S., 2020. Symmetry-adapted variational quantum eigensolver, *Physical Review A*, 101(5), p. 052340.

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Shaffar, A. W., Hakim, A. A., Jung, H. dan Shin, H., 2023. Comparative analysis of variational ansatzes in the kagome heisenberg antiferromagnet, *한국통신학회 학술대회논문집*, pp. 106–107.

Sim, S., Johnson, P. D. dan Aspuru-Guzik, A., 2019. Expressibility and entangling capability of parameterized quantum circuits for hybrid quantum-classical algorithms, *Advanced Quantum Technologies*, 2(12), p. 1900070.

Spall, J. C., 1998. An overview of the simultaneous perturbation method for efficient optimization, *Johns Hopkins apl technical digest*, 19(4), p. 482–492.

Spall, J. C., 2002. Multivariate stochastic approximation using a simultaneous perturbation gradient approximation, *IEEE transactions on automatic control*, 37(3), p. 332–341.

Sweke, R., Wilde, F., Meyer, J., Schuld, M., Fährmann, P. K., Meynard-Piganeau, B. dan Eisert, J., 2020. Stochastic gradient descent for hybrid quantum-classical optimization, *Quantum*, 4, p. 314.

Theory of Condensed Matter Group, University of Cambridge, 2026. Research — Many-Body quantum physics, `https://www.manybody.phy.cam.ac.uk/Research`. Diakses pada: 23 Mei 2026.

Tilly, J., Chen, H., Cao, S., Picozzi, D., Setia, K., Li, Y., Grant, E., Wossnig, L., Rungger, I., Booth, G. H. dkk., 2022. The variational quantum eigensolver: a review of methods and best practices, *Physics Reports*, 986, p. 1–128.

Troyer, M. dan Wiese, U.-J., 2005. Computational complexity and fundamental limitations to fermionic quantum monte carlo simulations, *Physical Review Letters*, 94(17), p. 170201.

Wecker, D., Hastings, M. B. dan Troyer, M., 2015. Progress towards practical quantum variational algorithms, *Physical Review A*, 92(4), p. 042303.

Wiersema, R., Zhou, C., de Sereville, Y., Carrasquilla, J. F., Kim, Y. B. dan Yuen, H., 2020. Exploring entanglement and optimization within the hamiltonian variational ansatz, *PRX quantum*, 1(2), p. 020319.

Wilde, M. M., 2017. *Quantum Information Theory*, 2 edn, Cambridge University Press.

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Yan, S., Huse, D. A. dan White, S. R., 2011. Spin-liquid ground state of the s= 1/2 kagome heisenberg antiferromagnet, *Science*, 332(6034), p. 1173–1176.

Zhu, W., Gong, S.-S. dan Sheng, D., 2025. Quantum spin liquids in frustrated kagome heisenberg model, *Quantum Frontiers*, 4(1), p. 11.