

UCLA Department of Physics & Astronomy

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Grand unification of quantum algorithms

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The three main branches of quantum algorithms, for simulation, search, and factoring, hold historically disparate origins. Today, we can now understand and appreciate all of these as being instances of a single framework, recently created by Gilyen, Su, Low, and Weibe, based on two key ideas: (1) the transformability of singular values by quantum evolution, and (2) the nonlinearity available to process two-level quantum signals. This remarkable unified framework opens doors to new quantum algorithms and opportunities for quantum advantage.