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# Practical quantum computing

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## Abstract

Quantum annealing continues to show great promise for solving hard optimization problems that occur across a wide range of business applications, though there is much still to learn about its ultimate potential. D-Wave has developed and delivered five generations of successively more powerful, commercial annealing quantum computers. With the significant technological progress that has accompanied the development of these systems, it is now possible to perform the quantum annealing algorithm far more quickly than the system decoherence time. This has opened the door to harnessing large scale coherent dynamics in the study of quantum phase transitions, as well as solving optimization problems. Here I'll review a recent example in the study of quantum critical dynamics in a programmable spin glass comprising 5000+ qubits. Insights from this work, as well as from years of experience working with customers on their important business problems, are driving development of D-Wave's next generation annealing quantum computer: Advantage2. I will review these insights, as well as plans for a our next generation quantum annealing and gate model quantum computers.