

Spin-glass bottlenecks in quantum annealing

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Frustrated spin systems exhibit bottlenecks (where the gap separating the ground state from excited states is small) inside the spin glass phase. These are in addition to the phase-transition bottleneck, which for many interesting problems is easier to navigate. Using a toy model as an illustration, I will argue that the number of spin-glass bottlenecks is logarithmic in system size. In practical terms it implies a crossover from polynomial to exponential scaling of complexity for larger sizes, when spin-glass bottlenecks become dominant. Implication of this result for more realistic spin glasses (e.g. Sherrington-Kirkpatrick model) will also be addressed.