FUTURE OF PHYSICAL QUANTUM ANNEALERS: IMPEDIMENTS AND HOPES

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Physical quantum annealers have so far been unable to demonstrate scalable performance advantages over standard state-of-the-art optimization algorithms. Nevertheless, multiple independent efforts continue to develop the technology, with the belief that optimizers with more coherent and more densely connected quantum bits are necessary to observe a quantum speedup. In this review we discuss the role of finite temperature and thermalization in preventing these devices from functioning as scalable optimizers. In light of this, we discuss alternative potentially promising uses for such devices that may enable them to provide advantages outside of optimization.