

Day 3

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Title: Next-Generation Quantum Annealing Testbed

Abstract:

For quantum annealing systems, enhancing coherence times and access to key control parameters may be central to demonstrating an advantage over classical algorithms. Under DARPA's Reversible Quantum Machine Learning and Simulation (RQMLS) program, MIT Lincoln Laboratory is responsible for operating a state-of-the-art quantum annealing testbed. This flexible testbed is fabricated using a 3D-integrated three-tier architecture [1], and contains up to 25 high-coherence flux qubits [2] with high-bandwidth individual flux controls (100 MHz) as well as high-fidelity readout. In this presentation, we will provide an overview of the testbed design and operation. We will also describe the framework for mapping problems onto the testbed hardware.

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References

[1] D. Rosenberg et al., *npj Quantum information* 3, 42 (2017)

[2] S. Novikov et al., APS March Meeting (2021)