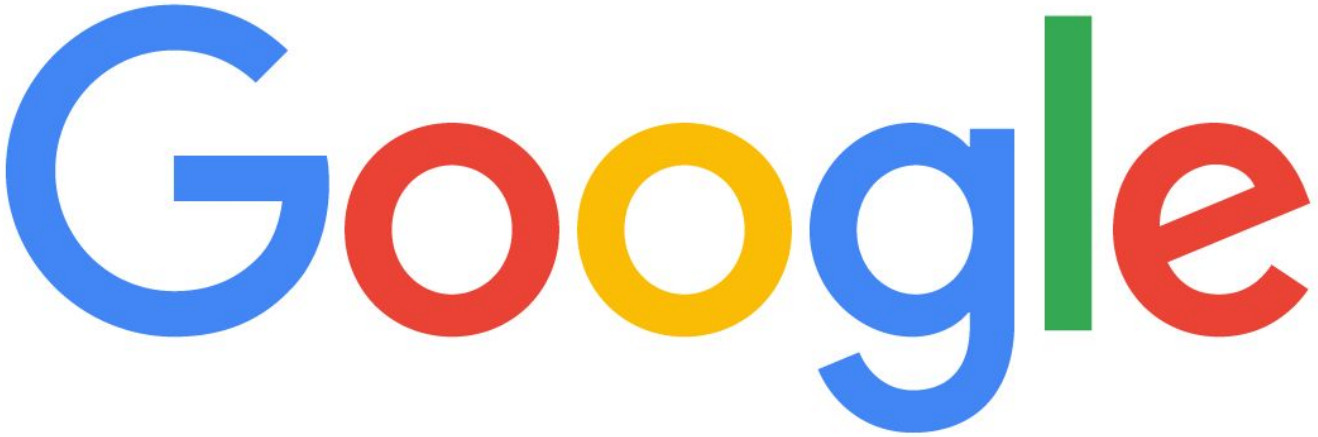


Director: Hartmut Neven

Theory

- Vadim smelyanskiy
- Ryan Babbush
- Sergio Boixo
- Vasil Denchev
- Nan Ding
- Sergei Isakov
- Masoud Mosheni
- Alireza Shabani

Experimental

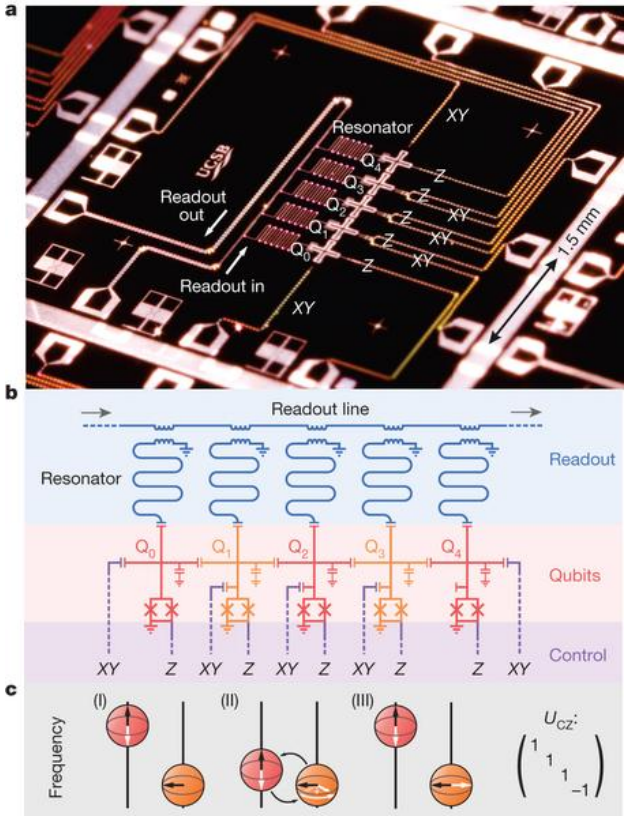
- John Martinis
- Rami Barends
- Yu Chen
- Brian Burkett
- Austin Fowler
- Rob Graff
- Evan Jeffrey
- Erik Lucero
- Anthony Megrant
- Josh Mutus
- Matthew Neeley
- Pedram Roushan
- Daniel Sank
- Julian Kelly

Areas of interest

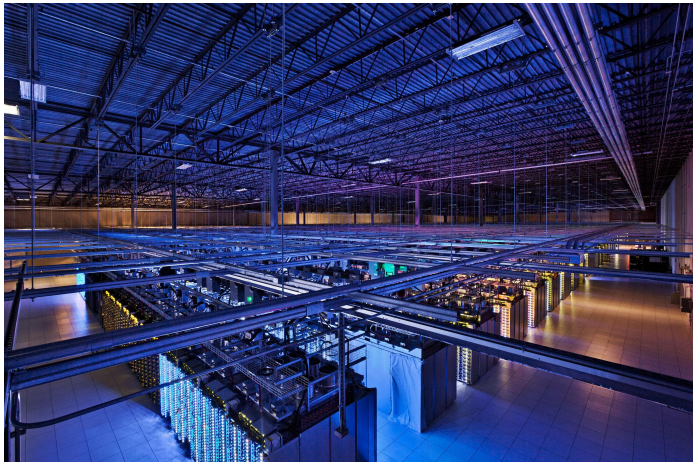
- Prospects for quantum computation in the
  - short term: quantum annealing, optimization, sampling
  - medium term: quantum annealing, small gate based quantum devices (no fault tolerant)
  - long term: universal fault tolerant quantum computation
- Experimental devices based on superconducting qubits
  - qubit design (qubits, measurement, control, coupling, gates)
  - noise characterization (low frequency noise)
  - quantum annealing device design
  - high fidelity gates
  - surface code
- Physics simulations
  - superconducting qubits low level simulations
  - open system simulations with many qubits
    - mean field trajectories + incoherent tunneling
    - quantum Monte Carlo
    - instantons
- Benchmarking of optimization problems
- Applications
  - machine learning
  - quantum chemistry

Capabilities

Experimental

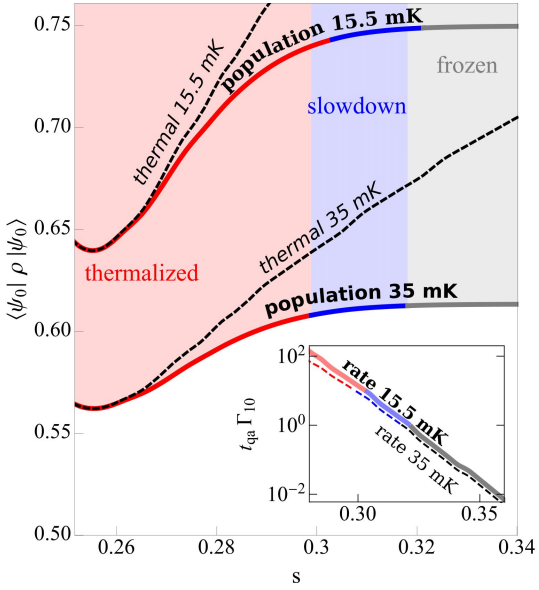


Numerics



Theory

$$\Gamma_{1\to 0} = \int_{-\infty}^{\infty} d\tau\, e^{i\Omega_{10}\tau - h(i\epsilon_p\tau + (W\tau)^2/2)} \left[\frac{\pi\tau_c}{i\beta}\mathrm{csch}\frac{(\tau - i\tau_c)}{\beta/\pi}\right]^{\frac{h\eta}{2\pi}} D(\tau)$$



Capabilities Google is looking for

1. Embedding strategies and applications to real world practical problems of increasing size. Optimization and samplings problems.
2. Asses the limiting factor of finite precision.
3. Access the role of noise on different aspects of machine performance.
4. Quantum Annealing in benchmarks for increasing size (spin glass theory, finite temperature statistics).
5. Superconducting qubit design.

Contact Information

- Hartmut Neven
- Director of Quantum A.I. Lab
- Google
- nenen@google.com
- https://plus.sandbox.google.com/+QuantumAILab/posts