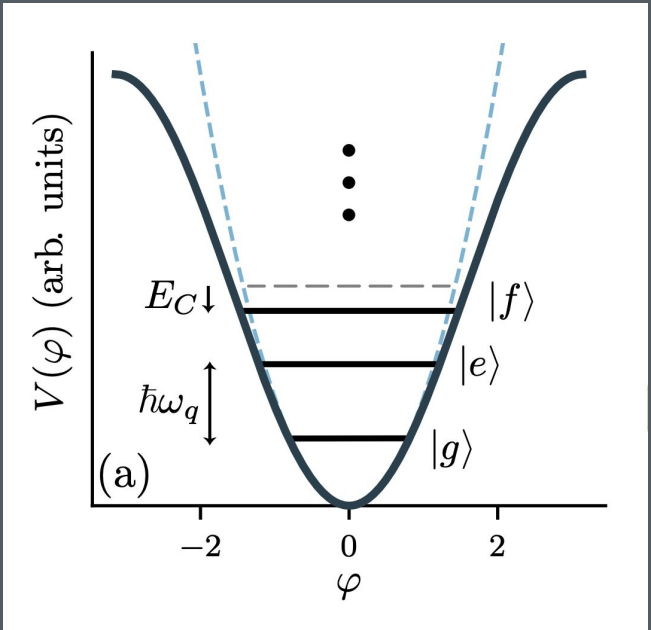
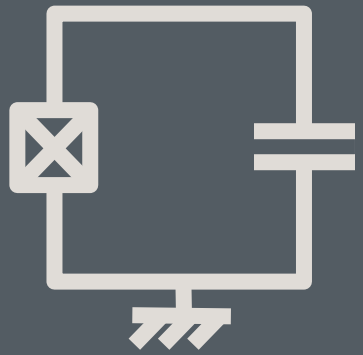
The Transmon





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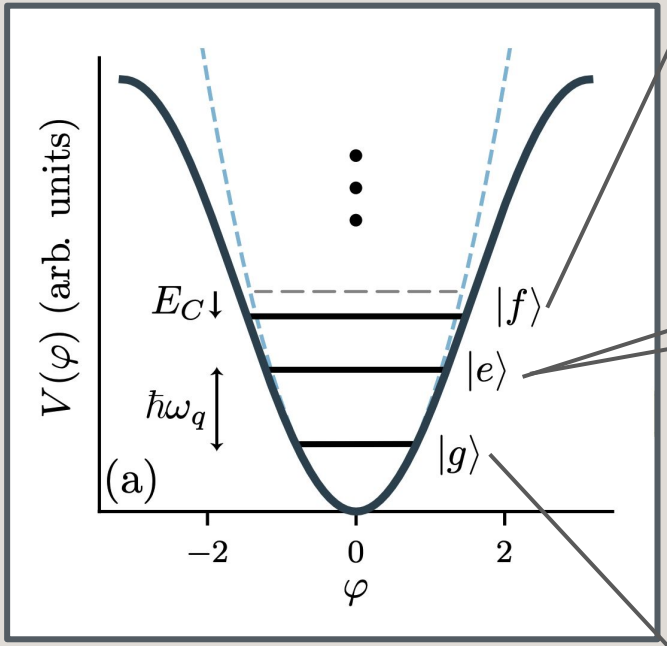
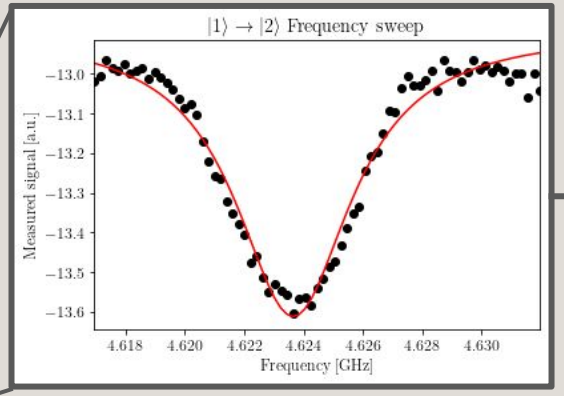
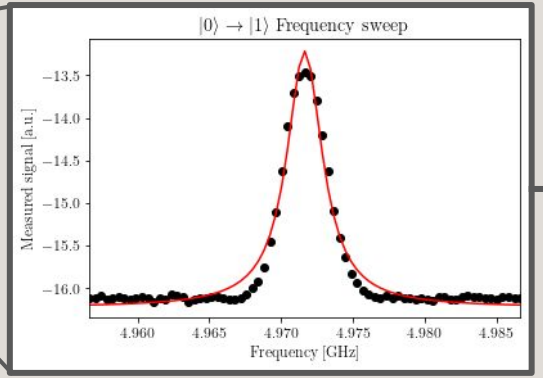
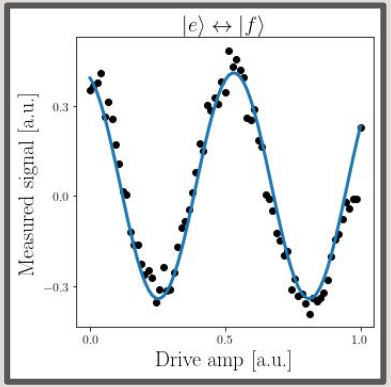
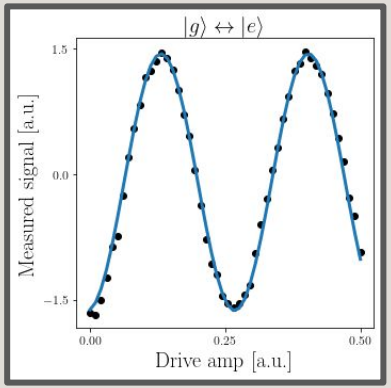
Hardware: the qutrit











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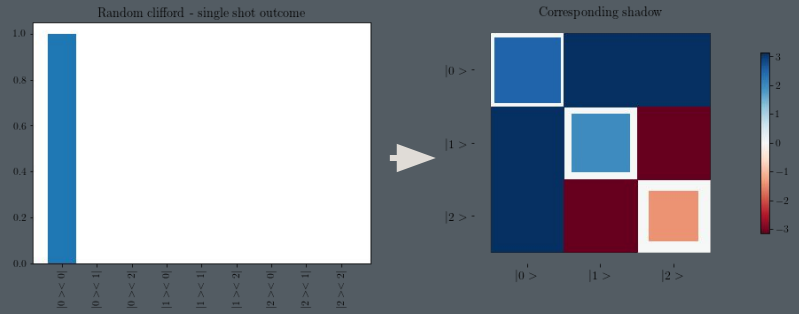
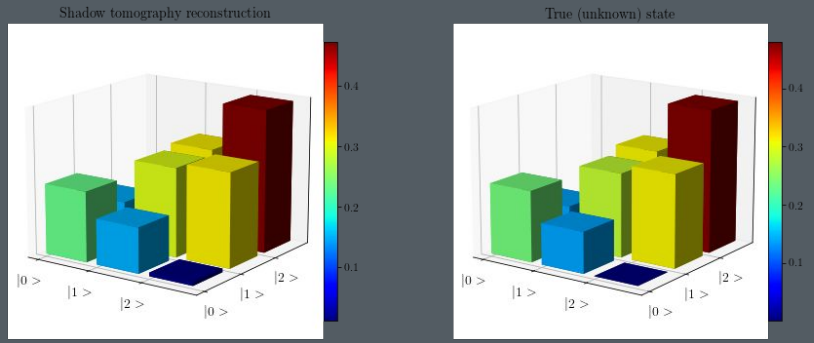
Shadow qutrit tomography

Random gate - Measure bitstring

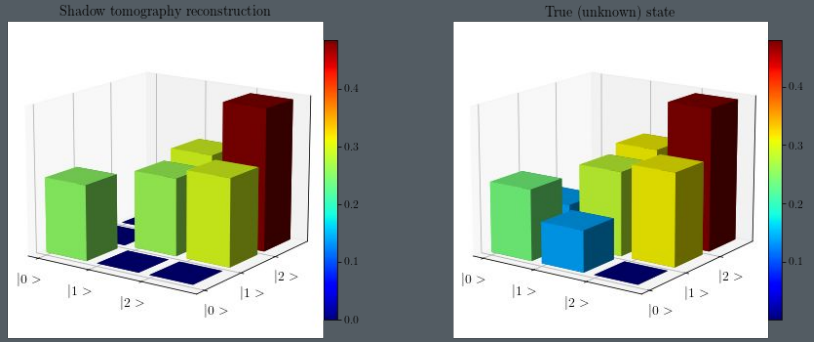
Shadow



N=9 circuits



N=2 circuits!



ARTICLES
https://doi.org/10.1038/s41567-020-0932-7

nature physics

Check for updates

Predicting many properties of a quantum system from very few measurements

Hsin-Yuan Huang[1,2], Richard Kueng[1,2,3] and John Preskill[1,2,4]

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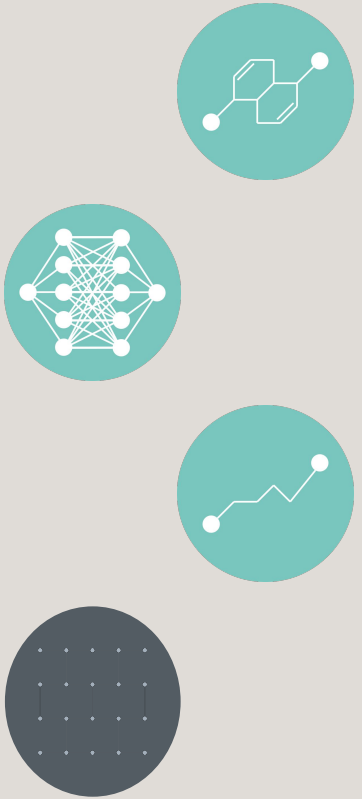
Applications

- Quantum hardware is always looking for ways to **characterise the noise** in their devices - our qutrit protocol has significant benefits
    - If exotic qutrit software is your thing - here is an efficient approach to debugging and improving your software
    - If qubits are all you're interested in, then here is an efficient way to detect and diagnose leakage in your gates.
- The wider community (both **academic and commercial**) stand to benefit from scalable diagnostics - especially in the NISQ era
- Future: qudits, gates



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