SNL slide for Rainer Blatt

Solvay Conference on QI

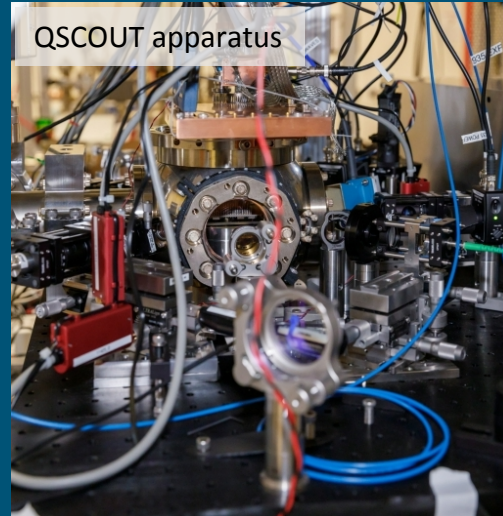# Trapped ion quantum computing at Sandia National Labs

Systems: QSCOUT

Sandia operates QSCOUT, a ytterbium ion quantum computing testbed that runs QC algorithms based on user proposals. The custom hardware and software provides users with a high degree of control in their experiments.
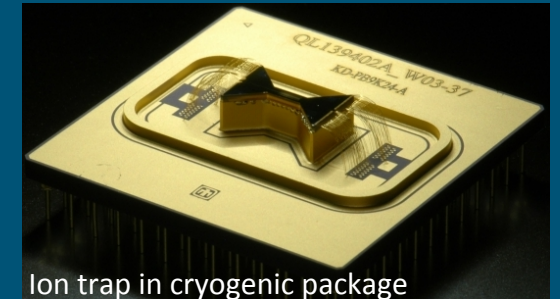
*https://qscout.sandia.gov

QSCOUT apparatus

Collaborations

Linear-, junction-, and other specialized surface ion traps have been designed and fabricated by Sandia in collaborations with academic groups, government labs, and commercial entities around the world.


Ion trap in cryogenic package

Triangle trap

Integrated technology

Technologies integrated with surface ion traps will ultimately be needed to support more complex quantum computers as well as ion-based quantum devices like atomic clocks. Sandia is currently researching integrated detectors, optical waveguides, and optical modulators for use with ion traps.
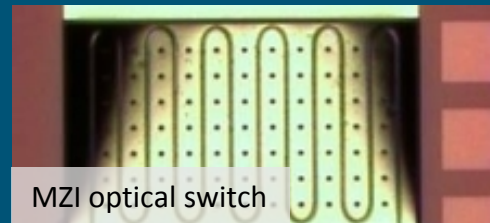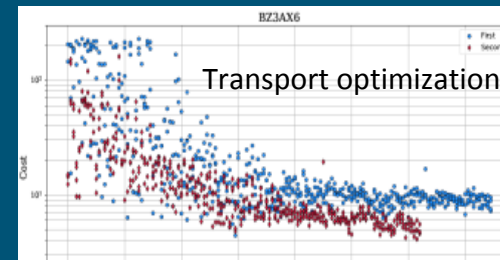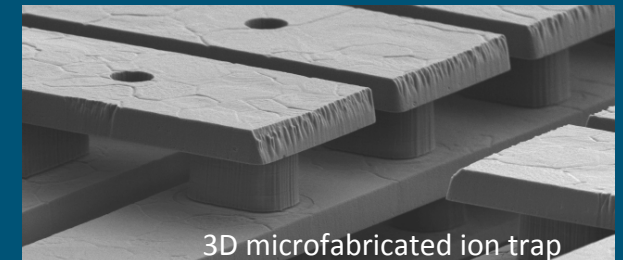

MZI optical switch
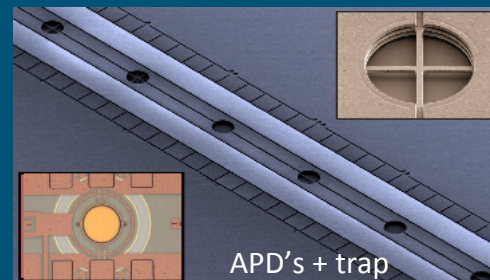
APD's + trap

Experiments

Future trapped ion quantum computers will depend on precision control of ion-qubit systems. Sandia is performing research on motional heating, low excitation transport, and pulse shaping to improve the fidelity and power of trapped ion quantum computers.

Transport optimization

3D microfabricated ion trap