SRI International

Summary of qualifications and capabilities

- Miniature integrated vacuum cells
- Ultra-high vacuum "*Channel Cell*" technology
- High-optical-access vacuum cells
- Vacuum optics
- Planar-integrated electrical feed-throughs and electrodes
  - DC to microwaves
- Miniature ion pumps for direct integration with vacuum cells
- Custom DFB and VCSEL lasers
- Spindt-type cold-cathode emitters

We are interested in supporting the integration and miniaturization of quantum computing systems for neutral atoms or ion qubits

Miniaturization Technologies for Atomic Systems

Integrated vacuum cell fabrication and ion pump technology

AQuA-64 vacuum cell for quantum computing with neutral atoms

- Glass and silicon fabrication
- Scalable design
- High bake-out temperatures (up to 400 °C)
- Technology applicable to ion-based systems

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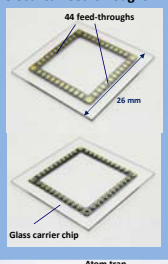
Developed in collaboration with Prof. Mark Saffman, University of Wisconsin, Prof. Dana Anderson, University of Colorado Boulder, and ColdQuanta

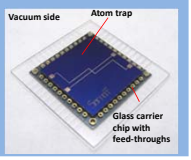
Ultra-high vacuum *"Channel Cell"* technology

Features:

- Single substrates vacuum interconnects
- Differential pumping
- $P < 10^{-10}$ Torr
- High optical access
- Planar feed-throughs
  - High current
  - High voltage
- Integrated
  - Active pumps
  - Atom source
  - Getters
  - Optics
- 400 °C bakeout

High-density/low-current electrical feed-throughs

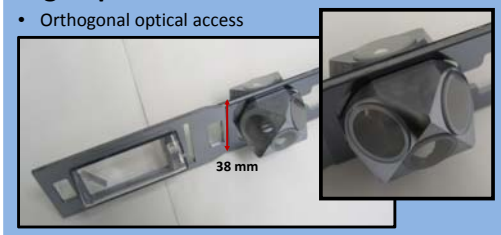




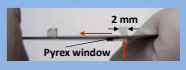
Work developed under the DARPA gBECi Program in collaboration with University of Colorado Boulder

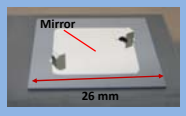
High-optical-access vacuum cells and vacuum optics

- Orthogonal optical access

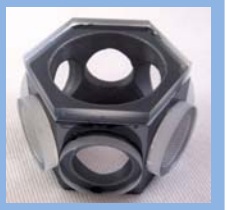


- Vacuum optics





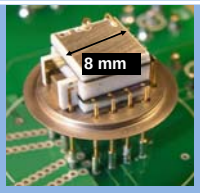
- Hexagonal cell (AR-coated windows)



Integration of miniature opto-atomic systems

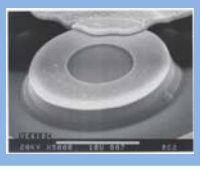
Example of an RF-interrogated, end-transition CSAC atomic clock

Work developed under the DARPA CSAC program in collaboration with Princeton University



Lasers

Custom DFB and VCSEL lasers for atom pumping

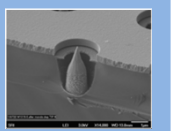


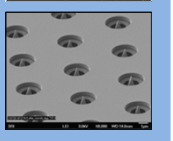
Spindt cathode technology

Cold-cathode emitters and arrays

Applications:

- **Electron-impact ionization**, RF-systems, TWTs, FELs, X-rays, spacecraft charge management, displays, field ionization, neutron generation





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