

Recent Developments in Quantum Computing

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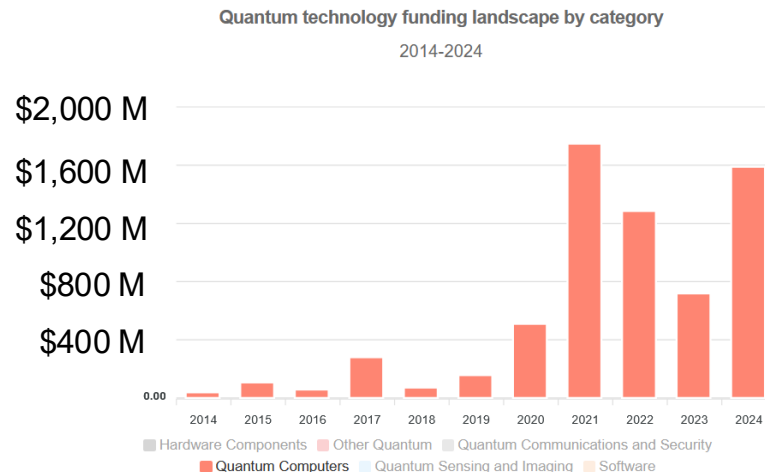
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Quantum Technology Highlights

(these are exciting times for quantum science and technology)

Private Investment in Quantum Technologies

- The last decade has seen an explosive growth in public and private investment in the quantum computing industry.
- The Quantum Economic Development Consortium (QED-C) estimates the quantum computing market was \$1.4 B in 2025



Ruane, J., Kiesow, E., Galatsanos, J., Dukatz, C., Blomquist, E., Shukla, P., "The Quantum Index Report 2025", MIT Initiative on the Digital Economy, Massachusetts Institute of Technology, Cambridge, MA, May 2025

Attracting companies to New Mexico lets us leverage this private investment

The Federal Government is increasing Quantum efforts

(EO 14413)

- “America stands at the cusp of a quantum revolution.”
- “Quantum information science and technology (QIST) will provide transformational capabilities that will drive American innovation, power economic growth, generate high-paying jobs, and bolster national security.”
- Sec. 4 – “Harnessing Quantum Computing for Scientific Applications.”
- Sec. 5 – “Deploying Quantum-Enabled Sensors and Networks.”
- Sec. 6 – “Bolstering the Domestic Ecosystem for Quantum Supply Chains.”
- Sec. 8 – “Expanding and Retaining the Quantum Workforce.”



New Mexico is positioned to play a leadership role in these areas

Three Notable Federal Programs in Quantum Computing

DARPA



NSA / DEVCOM



DOE



Genesis Mission



These programs will accelerate quantum impact for the nation

The Quantum Computing Landscape is Highly Competitive

Companies in DARPA's Quantum Benchmarking Initiative

- **Atom Computing**, Boulder CO
- **Diraq**, Sydney, Australia
- **IonQ**, College Park, MD
- **Google Quantum AI**, Mountain View, CA
- **Microsoft**, Redmond, VA
- **Nord Quantique**, Sherbrooke, Canada
- **Photonic**, Vancouver, Canada
- **PsiQuantum**, Palo Alto, CA
- **Quantinuum**, Broomfield CO
- **Quantum Motion**, London, UK
- **QuEra**, Boston, MA
- **SQC**, Sydney, Australia
- **Xanadu**, Toronto, Canada
- **IBM**, Yorktown Heights, NY
- **Quandela**, Massy, France



No clear leader has emerged

Why New Mexico?

(an incredible quantum foundation to build on)

Long History of Quantum Innovation

A 40+ YEAR QUANTUM LEGACY AT LOS ALAMOS

1982



No-cloning theorem

Future LANL theorist Wojciech Zurek co-authors the landmark result that an unknown quantum state cannot be perfectly copied.

1983



Feynman at Los Alamos

Richard Feynman presents “Tiny Computers Obeying Quantum Mechanical Laws” at LANL’s 40th Anniversary symposium.

1996–
1997



Foundational error-correction work

LANL researchers develop the perfect five-qubit code and the general Knill–Laflamme conditions for quantum error correction.

2015–
2020



Commercial quantum system on site

LANL acquires and installs a D-Wave 2X quantum annealer, enabling hands-on application and algorithm research.

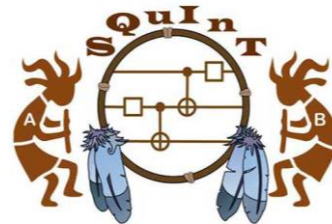
2018–
today



World-class workforce pipeline

The Quantum Computing Summer School launches in 2018; in 2026, 20 of nearly 1100 applicants were accepted ($\approx 2\%$), and students had produced 40+ papers over seven years.

Southwest Quantum Information and Technology Conference (SQuInt)



1997 to Present



Two notable highlights, there are many more...

An Incredible Quantum Workforce

- It has been estimated that there are more than 500 Quantum Technology experts working in New Mexico
 - This includes researchers at the laboratories and universities
- Leveraging this workforce, laboratories and universities train many experts that support the national quantum industry



THE UNIVERSITY OF
NEW MEXICO.



Sandia
National
Laboratories



New Mexico has one of the largest quantum-ready workforces in the nation

Los Alamos National Laboratory's Expertise

(basic research, compelling use cases, and workforce development)

Los Alamos National Laboratory does a wide range of synergistic Quantum Research and Development Activities

Quantum R&D at LANL

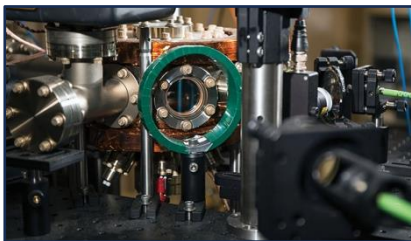
Computing



Materials



Sensing



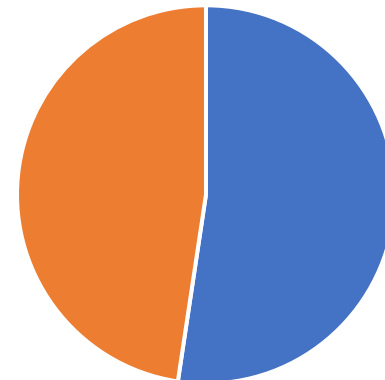
Communications



NATIONAL HIGH
MAGNETIC
FIELD LABORATORY

Supporting around 200 scientists

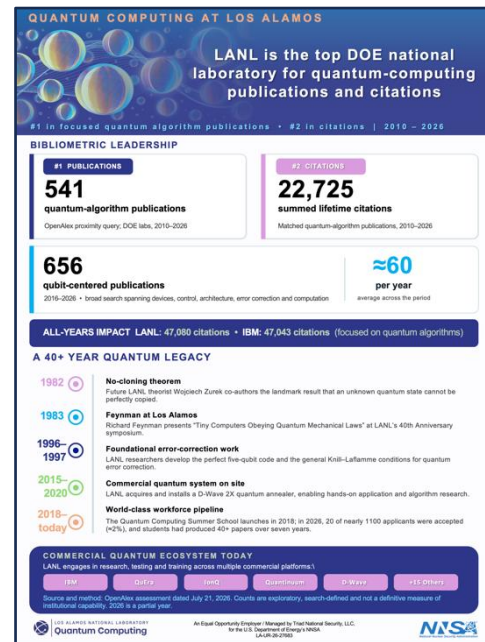
LANL Quantum Work



■ Computing ■ Experiment

Nation Leading Quantum Publication Record

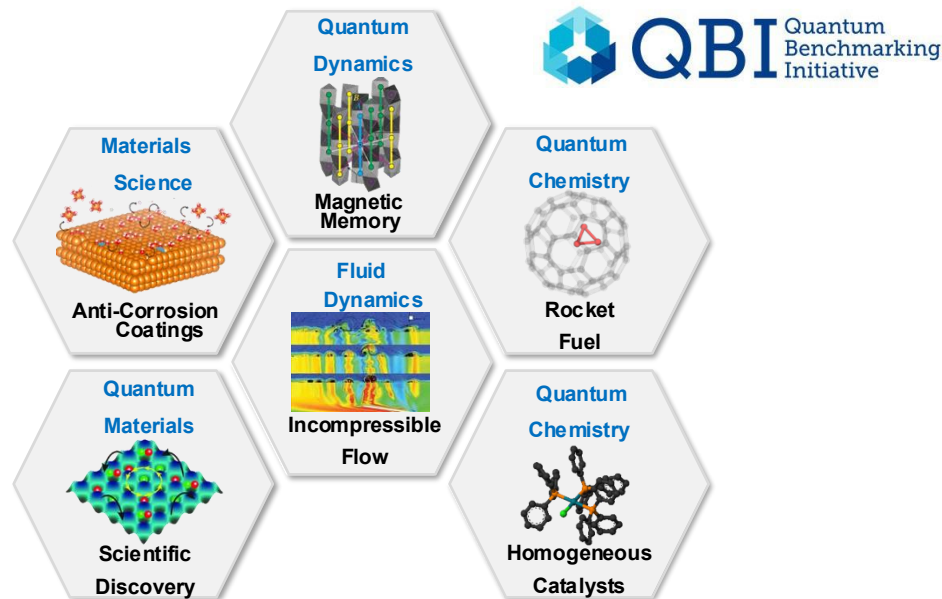
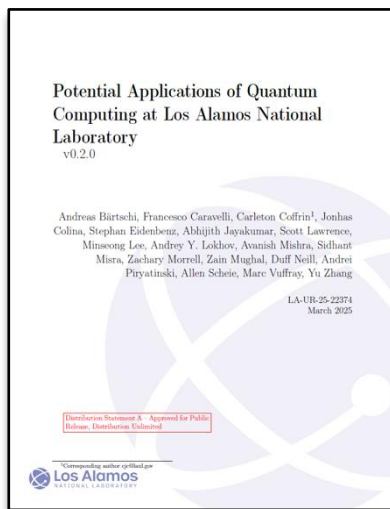
- **LANL invests significant resources in Quantum research**
 - ~60 publications every year
- **LANL focus using Commercial Quantum Computers**
 - First commercial QC hardware hosted on site in 2015
 - Quantum Cloud access since 2017
 - Currently engaging ~20 quantum computing companies



LANL has been working with commercial quantum industry for the last decade

Supporting Applications of Quantum Computers

LANL Applications Report brings together
Domain Experts with Quantum Experts



LANL has deep expertise in applications of quantum computers

Significant Workforce Development Efforts

- **LANL's Quantum Computing Summer School**
 - 20 student deep research experience
 - Selected from 1000 applicants
- **BEAM Summer School**
 - Train NM high school and college students in optics technologies
 - Hosted at McCurdy Charter School, Espanola, NM
- **Santa Fe Community College**
 - In discussions to develop quantum technology curriculum

LANL Quantum Computing Summer School 2026



LANL supports quantum workforce development for New Mexico and the Nation

NM State Inspired Efforts at Los Alamos National Laboratory

Los Alamos Center for Quantum Computing (CQC)



Focus on workforce development

This building hosts:
~15 Staff
~15 Postdocs
~20 Summer Students



Quantum New Mexico Institute (QNM-I)



QNM-I meeting in Santa Fe (01/12/26)
LANL, Sandia, UNM

Impacts from New Mexico's investments in Quantum

NM State Inspired Efforts at Los Alamos National Laboratory

Quantum Frontier Project



Roadrunner Quantum Lab



Quantum Demonstration Facility



Benildus Hall



LANL's scale of industry engagement would not be possible without these efforts

**New Mexico state efforts in quantum
continue to have a real impact
and position the state to be a national leader.**

Thank You