

About

Research

Applied Mathematics

Computer Science

Advanced Computing Technology

Computational Partnerships

Cross Cutting Activities

Investing in People

Exascale Computing Project [↗](#)

Artificial Intelligence (AI)

Quantum Information Science (QIS)

Facilities

Science Highlights

Benefits of ASCR

Funding Opportunities

Computational Science Graduate Fellowship (CSGF)

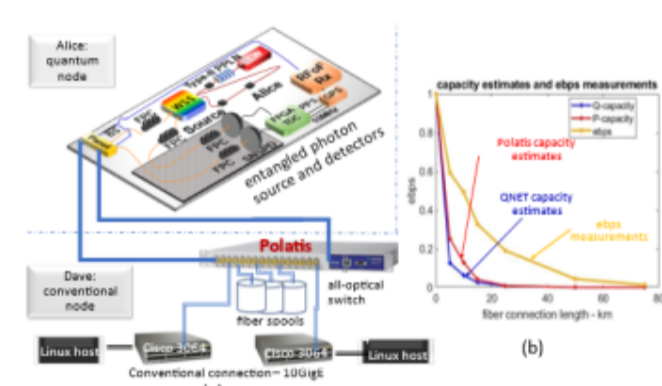
Advanced Scientific Computing Advisory Committee (ASCAC)

Community Resources

Office Hours

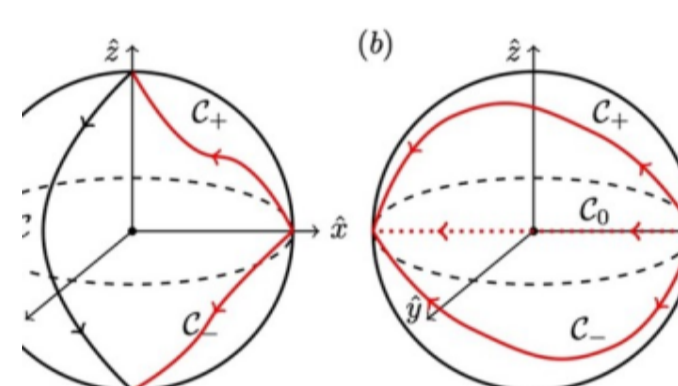
Highlights

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Scientists Compare Throughput for Quantum vs. Conventional Networks

A comparison of throughput measurements and analytical capacity estimates for quantum networks finds surprising patterns.



Novel Hardware Approach Produces a New Quantum Computing Paradigm

New theoretical approach to quantum computing hardware design via an algorithm avoids some of the complex difficulties in modern quantum computers.

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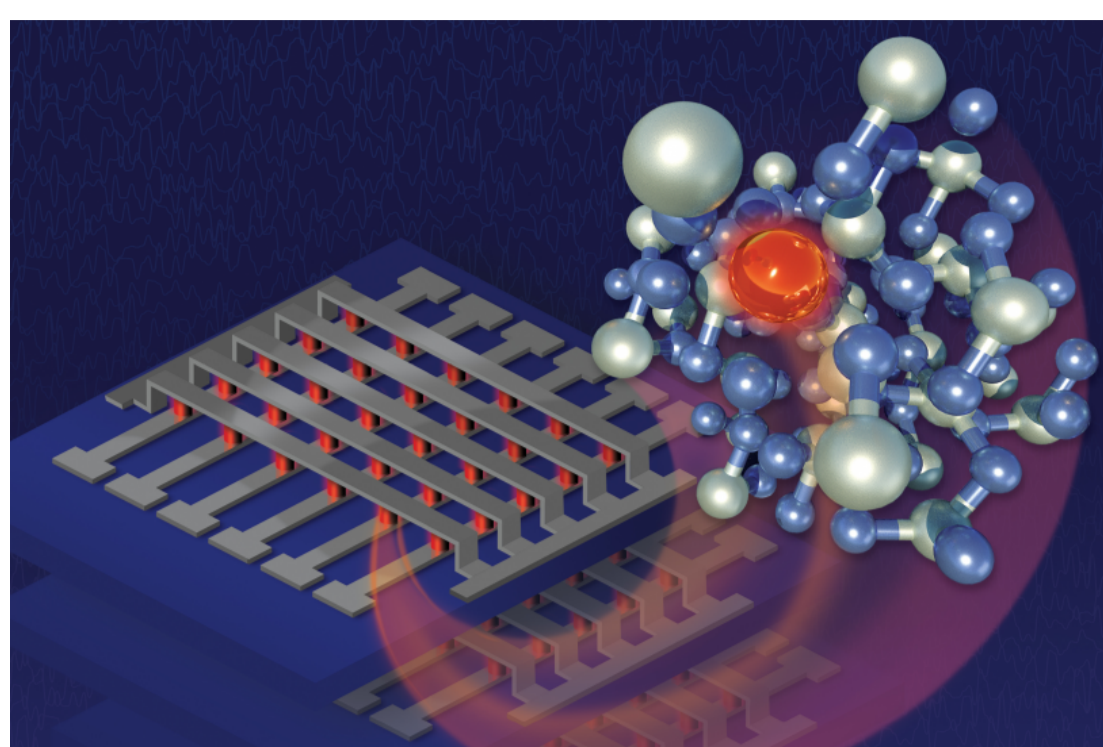
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Advanced Computing Technology



ASCR Advanced Computing Technology supports research focused on the development of emerging computing technologies such as quantum information systems (QIS) and neuromorphic efforts as well as investments in microelectronics in partnership with the other Office of Science program offices, the Exascale Computing Project (ECP), Research and Evaluation Prototypes (REP), and ASCR-specific initiatives in cybersecurity.

The Exascale Computing Project (ECP) has developed exascale-ready applications and solutions that address currently intractable problems of strategic importance and national interest; created an expanded and vertically-integrated software stack now deployed on DOE HPC pre-exascale and exascale systems; and delivered U.S. HPC vendor technology advances essential to the development of DOE HPC pre-exascale, exascale, and post-exascale systems. More information can be found at the [ECP website](#) [↗](#).

Research and Evaluation Prototypes (REP) has a long history of partnering with U.S. vendors to develop future computing technologies and testbeds that push the state-of-the-art and enable DOE researchers to better understand the challenges and capabilities of emerging technologies.

In addition, ASCR supports investments in the National Quantum Information Science Research Centers, QIS infrastructure for the research community through access to commercial quantum computers, and quantum computing and quantum internet testbeds.

ASCR Funding

- FY2024: Microelectronics Science Research Center Projects for Energy Efficiency and Extreme Environments: [Press Release](#), [Award List](#) [↗](#), [Lab Funding Opportunity](#) [↗](#)
- FY2024: EXPRESS: 2024 Exploratory Research for Extreme-Scale Science: [Press Release](#), [Award List](#) [↗](#), [Funding Opportunity](#) [↗](#)
- FY2024: FY2024 Funding a New Energy Sciences Workforce (RENEW): [Press Release](#), [Award List](#) [↗](#), [Funding Opportunity](#) [↗](#)
- FY2024: Advancements in Artificial Intelligence for Science: [Press Release](#), [Award List](#) [↗](#), [Funding Opportunity](#) [↗](#)
- FY2024: Competitive Portfolios for Advanced Scientific Computing Research: [Press Release](#), [Award List](#) [↗](#), [Lab Funding Opportunity](#) [↗](#)
- FY2024: FY2024 Funding for Accelerated, Inclusive Research (FAIR): [Press Release](#), [Award List](#) [↗](#), [Funding Opportunity](#) [↗](#)
- FY2024: Early Career Research Program: [Press Release](#), [Award List](#) [↗](#), [Funding Opportunity](#) [↗](#)
- FY2023: Accelerate Innovations in Emerging Technologies: [Press Release](#), [Award List](#) [↗](#), [Lab Funding Opportunity](#) [↗](#)
- FY2023: Quantum Testbed Pathfinder: [Press Release](#), [Award List](#) [↗](#), [Funding Opportunity](#) [↗](#)
- FY2023: EXPRESS: 2023 Exploratory Research for Extreme-Scale Science: [Press Release](#), [Award List](#) [↗](#), [Funding Opportunity](#) [↗](#)
- FY2023: Advanced Scientific Computing Research – Reaching a New Energy Sciences Workforce (ASCR-RENEW): [Press Release](#), [Award List](#) [↗](#), [Funding Opportunity](#) [↗](#)
- FY2023: FY2023 Funding for Accelerated, Inclusive Research (FAIR): [Press Release](#), [Award List](#) [↗](#), [Funding Opportunity](#) [↗](#)
- FY2023: Early Career Research Program: [Press Release](#), [Award Abstracts](#) [↗](#), [Funding Opportunity](#) [↗](#)
- FY2022: EXPRESS: 2022 Exploratory Research for Extreme-Scale Science: [Press Release](#), [Award List](#) [↗](#), [Funding Opportunity](#) [↗](#)
- FY2022: Early Career Research Program: [Press Release](#), [Award Abstracts](#) [↗](#), [Funding Opportunity](#) [↗](#)
- FY2021: Quantum Internet to Accelerate Scientific Discovery: [Press Release](#), [Award List](#) [↗](#), [Lab Funding Opportunity](#) [↗](#)
- FY2021: Microelectronics Co-Design Research: [Press Release](#), [Award List](#) [↗](#), [Lab Funding Opportunity](#) [↗](#)
- FY2021: 5G Enabled Energy Innovation Advanced Wireless Networks for Science: [Press Release](#), [Award List](#) [↗](#), [Lab Funding Opportunity](#) [↗](#)
- FY2021: Early Career Research Program: [Press Release](#), [Award Abstracts](#) [↗](#), [Funding Opportunity](#) [↗](#)
- FY2020: Neuromorphic Computing for Accelerating Scientific Discovery: [Press Release](#), [Award List](#) [↗](#), [Funding Opportunity](#) [↗](#)
- FY2020: National Quantum Information Science Research Centers: [Press Release](#), [Award List](#), [Funding Opportunity](#) [↗](#)
- FY2020: Early Career Research Program: [Press Release](#), [Award Abstracts](#) [↗](#), [Funding Opportunity](#) [↗](#), [Lab Funding Opportunity](#) [↗](#)
- FY2019: Early Career Research Program: [Press Release](#), [Award Abstracts](#) [↗](#), [Funding Opportunity](#) [↗](#), [Lab Funding Opportunity](#) [↗](#)
- FY2018: Quantum Testbeds for Science: [Press Release](#), [Award List](#) [↗](#), [Lab Funding Announcement](#) [↗](#)
- FY2018: Quantum Testbed Pathfinder: [Press Release](#), [Award List](#) [↗](#), [Funding Announcement](#) [↗](#), [Lab Funding Announcement](#) [↗](#)
- FY2018: Early Career Research Program: [Press Release](#), [Award Abstracts](#) [↗](#), [Funding Announcement](#) [↗](#), [Lab Funding Announcement](#) [↗](#)

Award abstracts and information about awards made prior to FY2018 can be found [here](#) [↗](#).

ASCR Workshops and Reports

- [2024 Workshop on Energy-Efficient Computing for Science \(September 2024\)](#) [↗](#)
- [2024 Workshop on Analog Computing for Science \(September 2024\)](#) [↗](#)
- [2024 Workshop on Neuromorphic Computing for Science \(September 2024\)](#) [↗](#)
- [Report for the ASCR Workshop on Basic Research Needs in Quantum Computing and Networking \(July 2023\)](#)
- [Reimagining Codesign for Advanced Scientific Computing \(April 2022\)](#)
- [Roundtable Report: Terahertz and 6G Wireless Communications in Science and Extreme Environments \(October 2020\)](#)
- [5G Enabled Energy Innovation: Advanced Wireless Networks for Science \(March 2020\)](#)
- [AI for Science: Report on the Department of Energy Town Halls on Artificial Intelligence for Science \(February 2020\)](#)
- [From Long-distance Entanglement to Building a Nationwide Quantum Internet: Report of the DOE Quantum Internet Blueprint Workshop \(February 2020\)](#)
- [Data and Models: A Framework for Advancing AI in Science \(December 2019\)](#)
- [Quantum Networks for Open Science \(QNOS\) Workshop \(April 2019\)](#)
- [Workshop Report on Basic Research Needs for Scientific Machine Learning: Core Technologies for Artificial Intelligence \(February 2019\)](#)
- [Basic Research Needs for Microelectronics \(October 2018\)](#)
- [Extreme Heterogeneity 2018: Productive Computational Science in the Era of Extreme Heterogeneity Report for DOE ASCR Basic Research Needs Workshop on Extreme Heterogeneity \(January 2018\)](#)
- [ASCR Report on a Quantum Computing Testbed for Science \(December 2017\)](#)

Workshop and reports completed prior to FY2018 can be found [here](#).

Other Notable Reports

- [Advanced Research Directions on AI for Science, Energy, and Security: Report on Summer 2022 Workshops \(May 2023\)](#)
- [Opportunities and Challenges from Artificial Intelligence and Machine Learning for the Advancement of Science, Technology, and the Office of Science Missions \(September 2020\)](#)
- [National Strategic Overview for Quantum Information Science \(September 2018\)](#) [↗](#)

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