

116TH CONGRESS
2D SESSION

H. R. 8279

To establish and support a quantum network infrastructure research and development program at the Department of Energy, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

SEPTEMBER 16, 2020

Mr. ZELDIN (for himself and Mr. FOSTER) introduced the following bill; which was referred to the Committee on Science, Space, and Technology

A BILL

To establish and support a quantum network infrastructure research and development program at the Department of Energy, and for other purposes.

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*

3 **SECTION 1. SHORT TITLE.**

4 This Act may be cited as the “Quantum Network In-
5 frastructure Act of 2020”.

6 **SEC. 2. DEFINITIONS.**

7 Section 2 of the National Quantum Initiative Act (15
8 U.S.C. 8801) is amended—

9 (1) by redesignating paragraph (7) as para-
10 graph (8); and

1 (2) by inserting after paragraph (6) the fol-
2 lowing:

3 “(7) QUANTUM NETWORK INFRASTRUCTURE.—
4 The term ‘quantum network infrastructure’ means
5 any facility, expertise, or capability that is necessary
6 to enable the development and deployment of scal-
7 able and diverse quantum network technologies.”.

8 **SEC. 3. DEPARTMENT OF ENERGY QUANTUM NETWORK IN-**
9 **FRAS****TRUCTURE RESEARCH AND DEVELOP-**
10 **MENT PROGRAM.**

11 Title IV of the National Quantum Initiative Act (15
12 U.S.C. 8851 et seq.) is amended by adding at the end
13 the following:

14 **“SEC. 403. DEPARTMENT OF ENERGY QUANTUM NETWORK**
15 **INFRASTRUCTURE RESEARCH AND DEVELOP-**
16 **MENT PROGRAM.**

17 “(a) IN GENERAL.—The Secretary of Energy (re-
18 ferred to in this section as the ‘Secretary’) shall carry out
19 a research, development, and demonstration program to
20 accelerate innovation in quantum network infrastructure
21 in order to—

22 “(1) facilitate the advancement of distributed
23 quantum computing systems through the internet
24 and intranet;

1 “(2) improve the precision of measurements of
2 scientific phenomena and physical imaging tech-
3 nologies; and

4 “(3) develop secure national quantum commu-
5 nications technologies and strategies.

6 “(b) PROGRAM.—In carrying out this section, the
7 Secretary shall—

8 “(1) coordinate with—

9 “(A) the Director of the National Science
10 Foundation;

11 “(B) the Director of the National Institute
12 of Standards and Technology;

13 “(C) the Chair of the Subcommittee on
14 Quantum Information Science of the National
15 Science and Technology Council established
16 under section 103(a); and

17 “(D) the Chair of the Subcommittee on the
18 Economic and Security Implications of Quan-
19 tum Science;

20 “(2) conduct cooperative research with indus-
21 try, National Laboratories, institutions of higher
22 education, and other research institutions to facili-
23 tate new quantum infrastructure methods and tech-
24 nologies, including—

1 “(A) quantum-limited detectors, ultra-low
2 loss optical channels, space-to-ground connec-
3 tions, and classical networking and cybersecu-
4 rity protocols;

5 “(B) entanglement and hyper-entangled
6 state sources and transmission, control, and
7 measurement of quantum states;

8 “(C) quantum interconnects that allow
9 short range local connections between quantum
10 processors;

11 “(D) transducers for quantum sources and
12 signals between optical and telecommunications
13 regimes and quantum computer-relevant do-
14 mains, including microwaves;

15 “(E) development of quantum memory
16 buffers and small-scale quantum computers
17 that are compatible with photon-based quantum
18 bits in the optical or telecommunications wave-
19 lengths;

20 “(F) long-range entanglement distribution
21 at both the terrestrial and space-based level
22 using quantum repeaters, allowing entangle-
23 ment-based protocols between small- and large-
24 scale quantum processors;

1 “(G) quantum routers, multiplexers, re-
2 peaters, and related technologies necessary to
3 create secure long-distance quantum commu-
4 nication; and

5 “(H) integration of systems across the
6 quantum technology stack into traditional com-
7 puting networks, including the development of
8 remote controlled, high performance, and reli-
9 able implementations of key quantum network
10 components;

11 “(3) engage with the Quantum Economic De-
12 velopment Consortium (QED-C) to transition com-
13 ponent technologies to help facilitate as appropriate
14 the development of a quantum supply chain for
15 quantum network technologies;

16 “(4) advance basic research in advanced sci-
17 entific computing and material science to enhance
18 the understanding, prediction, and manipulation of
19 materials and processes relevant to quantum net-
20 work infrastructure;

21 “(5) develop experimental tools and testbeds
22 necessary to support cross-cutting fundamental re-
23 search and development activities with diverse stake-
24 holders from industry and institutions of higher edu-
25 cation; and

1 “(6) consider quantum network infrastructure
2 applications that span the Department of Energy’s
3 missions in energy, environment, and national secu-
4 rity.

5 “(c) LEVERAGING.—In carrying out this section, the
6 Secretary shall leverage resources, infrastructure, and ex-
7 pertise across the Department of Energy and from—

8 “(1) the National Institute of Standards and
9 Technology;

10 “(2) the National Science Foundation;

11 “(3) the National Aeronautics and Space Ad-
12 ministration;

13 “(4) other relevant Federal agencies;

14 “(5) the National Laboratories;

15 “(6) industry stakeholders;

16 “(7) institutions of higher education; and

17 “(8) the National Quantum Information
18 Science Research Centers.

19 “(d) RESEARCH PLAN.—Not later than 180 days
20 after the date of the enactment of the Quantum Network
21 Infrastructure Act of 2020, the Secretary shall submit to
22 the Committee on Science, Space, and Technology of the
23 House of Representatives and the Committee on Energy
24 and Natural Resources of the Senate, a 4-year research

1 plan that identifies and prioritizes basic research needs re-
2 lating to quantum network infrastructure.

3 “(e) STANDARD OF REVIEW.—The Secretary shall
4 review activities carried out under this section to deter-
5 mine the achievement of technical milestones.

6 “(f) FUNDING.—Funds authorized to be appro-
7 priated for the Department of Energy’s Office of Science,
8 there shall be made available to the Secretary to carry out
9 the activities under this section, \$100,000,000 for each
10 of fiscal years 2021 through 2025.”.

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