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[Report No. 118-612]

To reauthorize the National Quantum Initiative Act, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

NOVEMBER 3, 2023

Mr. LUCAS (for himself, Ms. LOFGREN, Mr. COLLINS, Ms. STEVENS, Mr. WILLIAMS of New York, Mr. BOWMAN, Mr. BABIN, Mr. SORENSEN, Mr. OBERNOLTE, Mrs. FOUSHEE, Mr. MILLER of Ohio, and Ms. ROSS) introduced the following bill; which was referred to the Committee on Science, Space, and Technology

JULY 25, 2024

Additional sponsors: Mr. WEBER of Texas, Mr. CASTEN, Mr. BAIRD, Mr. MULLIN, Mr. MIKE GARCIA of California, Ms. SALINAS, Ms. TENNEY, Mr. JACKSON of North Carolina, Mr. KEAN of New Jersey, Ms. BONAMICI, Mr. WITTMAN, Mr. FEENSTRA, Ms. LEE of Pennsylvania, Ms. CARAVEO, Mrs. SYKES, Mr. MORELLE, Mr. NEGUSE, Ms. NORTON, Mr. THANEDAR, Mr. THOMPSON of Pennsylvania, Ms. DELBENE, and Mr. ALLRED

JULY 25, 2024

Reported with an amendment, committed to the Committee of the Whole House on the State of the Union, and ordered to be printed

[Strike out all after the enacting clause and insert the part printed in italic]

[For text of introduced bill, see copy of bill as introduced on November 3, 2023]

A BILL

To reauthorize the National Quantum Initiative Act, 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 “National Quantum Ini-*
5 *tiative Reauthorization Act”.*

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 paragraphs (4), (5), (6),*
10 *(7), the first paragraph (8) (relating to the definition*
11 *of the “Subcommittee on Economic and Security Im-*
12 *plications”), and the second paragraph (8) (relating*
13 *to the definition of the “Subcommittee on Quantum*
14 *Information Science”) as paragraphs (7), (9), (12),*
15 *(13), (15), and (16), respectively;*

16 *(2) by inserting after paragraph (3) the fol-*
17 *lowing new paragraphs:*

18 *“(4) FEDERAL LABORATORY.—The term ‘Federal*
19 *laboratory’ has the meaning given such term in sec-*
20 *tion 4 of the Stevenson-Wydler Technology Innovation*
21 *Act of 1980 (15 U.S.C. 3703).*

22 *“(5) FOREIGN COUNTRY OF CONCERN.—The term*
23 *‘foreign country of concern’ means—*

1 “(A) a country that is a covered nation (as
2 such term is defined in section 4872(d) of title
3 10, United States Code); and

4 “(B) any country that the Secretary of
5 Commerce, in consultation with the Secretary of
6 Defense, the Secretary of State, and the Director
7 of National Intelligence, determines to be en-
8 gaged in conduct that is detrimental to the na-
9 tional security or foreign policy of the United
10 States.

11 “(6) *FOREIGN ENTITY OF CONCERN*.—The term
12 ‘foreign entity of concern’ means a foreign entity that
13 is—

14 “(A) designated as a foreign terrorist orga-
15 nization by the Secretary of State under section
16 219(a) of the Immigration and Nationality Act
17 (8 U.S.C. 1189(a));

18 “(B) included on the list of specially des-
19 ignated nationals and blocked persons main-
20 tained by the Office of Foreign Assets Control of
21 the Department of the Treasury (commonly
22 known as the ‘SDN list’);

23 “(C) owned by, controlled by, or subject to
24 the jurisdiction or direction of a government of
25 a foreign country that is a covered nation (as

1 *such term is defined in section 4872 of title 10,*
2 *United States Code);*

3 *“(D) alleged by the Attorney General to*
4 *have been involved in activities for which a con-*
5 *viction was obtained under—*

6 *“(i) chapter 37 of title 18, United*
7 *States Code (commonly known as the ‘Espio-*
8 *nage Act’);*

9 *“(ii) section 951 or 1030 of title 18,*
10 *United States Code;*

11 *“(iii) chapter 90 of title 18, United*
12 *States Code (commonly known as the ‘Eco-*
13 *nomics Espionage Act of 1996’);*

14 *“(iv) the Arms Export Control Act (22*
15 *U.S.C. 2751 et seq.);*

16 *“(v) section 224, 225, 226, 227, or 236*
17 *of the Atomic Energy Act of 1954 (42*
18 *U.S.C. 2274, 2275, 2276, 2277, and 2284);*

19 *“(vi) the Export Control Reform Act of*
20 *2018 (50 U.S.C. 4801 et seq.); or*

21 *“(vii) the International Emergency*
22 *Economic Powers Act (50 U.S.C. 1701 et*
23 *seq.); or*

24 *“(E) determined by the Secretary of Com-*
25 *merce, in consultation with the Secretary of De-*

1 *fense and the Director of National Intelligence,*
2 *to be engaged in unauthorized conduct that is*
3 *detrimental to the national security or foreign*
4 *policy of the United States.”;*

5 *(3) in paragraph (7), as so redesignated, by*
6 *striking “(a)” each place it appears;*

7 *(4) by inserting after paragraph (7), as so red-*
8 *esignated, the following new paragraph:*

9 “(8) *NATIONAL LABORATORY.*—*The term ‘Na-*
10 *tional Laboratory’ has the meaning given such term*
11 *in section 2 of the Energy Policy Act of 2005 (42*
12 *U.S.C. 15801).”;*

13 *(5) by inserting after paragraph (9), as so red-*
14 *esignated, the following new paragraphs:*

15 “(10) *QUANTUM APPLICATIONS.*—*The term*
16 *‘quantum applications’ means applications that use*
17 *quantum information science engineering and tech-*
18 *nology, including quantum algorithms and software,*
19 *quantum computing and quantum-classical hybrids,*
20 *quantum sensing, quantum networking, quantum*
21 *encryption, or quantum communications applica-*
22 *tions.*

23 “(11) *QUANTUM COMPUTING.*—*The term ‘quan-*
24 *tum computing’ means any of a variety of quantum*
25 *computing technologies, including quantum annealing*

1 *and quantum gate-model systems that utilize a vari-*
2 *ety of qubit architectures, such as superconducting,*
3 *ion traps, photonics, neutral atoms, spin atoms, or*
4 *spin electrons.”;*

5 (6) *by amending paragraph (12), as so redesign-*
6 *ated, to read as follows:*

7 “(12) *QUANTUM INFORMATION SCIENCE, TECH-*
8 *NOLOGY, AND ENGINEERING.—The term ‘quantum in-*
9 *formation science, technology, and engineering’ means*
10 *the understanding, translation, use, or application of*
11 *the laws of quantum physics for the storage, trans-*
12 *mission, manipulation, computing, simulation, or*
13 *measurement of information.”; and*

14 (7) *by inserting after paragraph (13), as so re-*
15 *designated, the following new paragraph:*

16 “(14) *STEM.—The term ‘STEM’ means the aca-*
17 *demie and professional disciplines of science, tech-*
18 *nology, engineering, and mathematics, including com-*
19 *puter science.”.*

20 **SEC. 3. PURPOSES.**

21 *Section 3 of the National Quantum Initiative Act (15*
22 *U.S.C. 8802) is amended—*

23 (1) *in the matter preceding paragraph (1), by*
24 *striking “science and its technology applications” and*
25 *inserting “science, engineering, and technology”;*

1 (2) *in paragraph (1)—*

2 (A) *in the matter preceding subparagraph*
3 *(A), by striking “science and technology” and in-*
4 *serting “science, engineering, and technology”;*

5 (B) *by amending subparagraph (A) to read*
6 *as follows:*

7 “(A) *to expand the number of researchers,*
8 *educators, and students with training in quan-*
9 *tum information science, engineering, and tech-*
10 *nology to develop a domestic workforce pipeline*
11 *and retain international talent to the extent con-*
12 *sistent with national security and international*
13 *competitiveness;”;*

14 (C) *in subparagraph (B), by striking*
15 *“science at the” and inserting “science, engineer-*
16 *ing, and technology at the primary, secondary,”;*

17 (D) *in subparagraph (C), by striking*
18 *“basic”;*

19 (E) *in subparagraph (D)—*

20 (i) *by striking “science and tech-*
21 *nology” and inserting “science, engineering,*
22 *and technology”;* and

23 (ii) *by striking “and” after the semi-*
24 *colon; and*

1 (F) by adding at the end the following new
2 subparagraphs:

3 “(F) to support development of quantum
4 applications, including quantum-hybrid applica-
5 tions, to promote innovation and commercializa-
6 tion; and

7 “(G) to support technologies, including arti-
8 ficial intelligence, that could benefit from or ben-
9 efit the development of quantum technology and
10 promote research, development, demonstration,
11 and application of such technologies in quantum
12 information science, engineering, and tech-
13 nology.”;

14 (3) in paragraph (2), by striking “science and
15 technology” and inserting “science, engineering, and
16 technology”;

17 (4) in paragraph (3), by striking “science and
18 technology” and inserting “science, engineering, and
19 technology”;

20 (5) in paragraph (4)—

21 (A) by inserting “National Laboratories,”
22 after “Federal laboratories,”; and

23 (B) by striking “and” after the semicolon;

24 (6) in paragraph (5)—

1 (A) *in the matter preceding subparagraph*

2 (A)—

3 (i) *by inserting “partnerships, research*
4 *collaborations, and” after “international”;*
5 *and*

6 (ii) *by striking “science and technology*
7 *security” and inserting “science, engineer-*
8 *ing, and technology”;*

9 (B) *in subparagraph (A)—*

10 (i) *by inserting “, social benefit,” after*
11 *“innovation”; and*

12 (ii) *by striking “and” after the semi-*
13 *colon;*

14 (C) *in subparagraph (B), by striking the*
15 *period and inserting “; and”; and*

16 (D) *by adding at the end the following new*
17 *subparagraph:*

18 “(C) *to facilitate cooperative investment in*
19 *quantum capabilities between the United States*
20 *and its allies and partners to strengthen and se-*
21 *ecure the domestic supply chain and related eco-*
22 *system; and”;* and

23 (7) *by adding at the end the following new para-*
24 *graph:*

1 “(6) improving the maturity, scale, and short-
2 and long-term viability of the quantum technology in-
3 dustry, including small and medium-sized businesses
4 and startups representing a diversity of quantum spe-
5 cialties, and commercialization of domestic quantum
6 capacity across modalities.”.

7 **SEC. 4. NATIONAL QUANTUM INITIATIVE PROGRAM.**

8 Subsection (b) of section 101 of the National Quantum
9 Initiative Act (15 U.S.C. 8811) is amended—

10 (1) in paragraph (1)—

11 (A) by striking “development” and insert-
12 ing “research development, and near- and me-
13 dium-term, and long-term demonstration”;

14 (B) by striking “information science and
15 technology”; and

16 (C) by inserting “in diverse sectors” after
17 “applications”;

18 (2) in paragraph (2)—

19 (A) by striking “fundamental”;

20 (B) by striking “science and technology”
21 and inserting “science, engineering, and tech-
22 nology”; and

23 (C) by inserting “infrastructure,” after
24 “demonstration,”;

25 (3) in paragraph (3)—

1 (A) by inserting “and retain” after “to de-
2 velop”; and

3 (B) by striking “science and technology”
4 and inserting “science, engineering, and tech-
5 nology”;

6 (4) by amending paragraph (4) to read as fol-
7 lows:

8 “(4) provide for interagency planning and co-
9 ordination of Federal quantum information science,
10 engineering, and technology research, development,
11 demonstration, standards engagement, and other ac-
12 tivities under the Program, including activities au-
13 thorized pursuant to section 234 of the John S.
14 McCain National Defense Authorization Act for Fis-
15 cal Year 2019 (10 U.S.C. 4001 note), quantum edu-
16 cational activities and programs authorized pursuant
17 to section 10661 of the Research and Development,
18 Competition, and Innovation Act (42 U.S.C. 19261),
19 and activities conducted at any Federal laboratory;”;
20 and

21 (5) in paragraph (5)—

22 (A) by striking “industry and universities”
23 and inserting “industry, universities, and stra-
24 tegic allies”; and

1 (B) by inserting “, including human re-
2 sources” after “resources”.

3 **SEC. 5. NATIONAL QUANTUM COORDINATION OFFICE.**

4 Section 102 of the National Quantum Initiative Act
5 (15 U.S.C. 8812) is amended—

6 (1) in subsection (a)(2)—

7 (A) in subparagraph (A)—

8 (i) by inserting “who shall be” before
9 “appointed”; and

10 (ii) by inserting “, and who shall serve
11 a four year term, subject to renewal” before
12 the semicolon; and

13 (B) by amending subparagraph (B) to read
14 as follows:

15 “(B) staff comprised of employees detailed
16 from the Federal departments and agencies spec-
17 ified in section 103(b).”; and

18 (2) in subsection (b)—

19 (A) in paragraph (3), by striking “science
20 and technology” and inserting “science, engi-
21 neering, and technology research and workforce”;

22 (B) in paragraph (6), by striking “and”
23 after the semicolon;

24 (C) in paragraph (7), by striking the period
25 at the end and inserting “;”;

1 (D) by amending paragraph (4) to read as
2 follows:

3 “(4) ensure coordination among the collaborative
4 ventures or consortia established under this Act;”;

5 (E) in paragraph (7), by inserting “non-
6 profit research organizations,” after “univer-
7 sities,”; and

8 (F) by adding after paragraph (7), the fol-
9 lowing new paragraphs:

10 “(8) promote understanding and adoption of
11 quantum capabilities throughout the United States
12 economy as appropriate; and

13 “(9) track and promote policies that will ensure
14 stability of the United States quantum workforce,
15 quantum supply chain, domestic quantum industry,
16 and international trade.”.

17 **SEC. 6. SUBCOMMITTEE ON QUANTUM INFORMATION**
18 **SCIENCE.**

19 Section 103 of the National Quantum Initiative Act
20 (15 U.S.C. 8813) is amended—

21 (1) in subsection (b)—

22 (A) in paragraph (8), by striking “and”
23 after the semicolon;

24 (B) by redesignating paragraph (9) as
25 paragraph (14); and

1 (C) by inserting after paragraph (8) the fol-
2 lowing new paragraphs:

3 “(9) the Department of Health and Human
4 Services;

5 “(10) the Department of State;

6 “(11) the Department of Homeland Security;

7 “(12) the National Oceanic and Atmospheric Ad-
8 ministration;

9 “(13) the Department of Education; and”;

10 (2) in subsection (d)—

11 (A) in paragraph (1), by striking “the
12 quantum information science and technology re-
13 search” and inserting “quantum information
14 science, engineering, and technology research and
15 quantum application development, demonstra-
16 tion, and commercialization”;

17 (B) in paragraph (4), by inserting “, engi-
18 neering, and technology” after “science”;

19 (C) in paragraph (5),

20 (i) by inserting “, engineering, and
21 technology” after “science”; and

22 (ii) by inserting “and conduct com-
23 parative benchmarking of Federal invest-
24 ments and research strategies relative to

1 *those of our strategic partners and other*
2 *countries” after “development efforts”;*

3 *(D) in paragraph (6)—*

4 *(i) by striking “science and tech-*
5 *nology” and inserting “science, engineering,*
6 *and technology”;* and

7 *(ii) by striking “and” after the semi-*
8 *colon;*

9 *(E) in paragraph (7)—*

10 *(i) by inserting “, engineering and*
11 *technology” after “science”;* and

12 *(ii) by striking the period and insert-*
13 *ing “; and”;* and

14 *(F) by adding at the end the following new*
15 *paragraph:*

16 *“(8) facilitate interagency partnership opportu-*
17 *nities to advance quantum applications related to en-*
18 *vironment, advanced manufacturing, biotechnology,*
19 *space, and other sectors.”;*

20 *(3) in subsection (h)(2)(A), by inserting “, in-*
21 *cluding a description of agency roles and responsibil-*
22 *ities” before the period; and*

23 *(4) by adding at the end the following new sub-*
24 *section:*

25 *“(i) QUANTUM USE CASES.—*

1 “(1) *IN GENERAL.*—*The Subcommittee shall*
2 *identify potential use cases with respect to which*
3 *quantum computing could advance the missions of*
4 *participating agencies, including through on-prem-*
5 *ises, cloud-based, hybrid, or networked approaches.*

6 “(2) *QUANTUM ON-RAMP.*—*For each potential*
7 *use case identified pursuant to paragraph (1), the rel-*
8 *evant Federal agency, in consultation with the Sub-*
9 *committee, may develop a plan to enable such agency*
10 *to address each such potential use case.*

11 “(3) *REPORTING.*—*The Subcommittee, as part of*
12 *the annual report on the budget for the Program*
13 *under subsection (g) shall report progress in carrying*
14 *out the activities under this section, including infor-*
15 *mation relating to the following:*

16 “(A) *The potential use cases identified pur-*
17 *suant to paragraph (1).*

18 “(B) *The status of plans developed pursuant*
19 *to paragraph (2).*

20 “(C) *Any obstacles to addressing such po-*
21 *tential use cases, including lack of funding.”.*

22 **SEC. 7. NATIONAL QUANTUM INITIATIVE ADVISORY COM-**
23 **MITTEE.**

24 *Section 104 of the National Quantum Initiative Act*
25 *(15 U.S.C. 8814) is amended—*

1 (1) by amending subsection (b) to read as fol-
2 lows:

3 “(b) *QUALIFICATIONS.*—*The Advisory Committee shall*
4 *consist of members, appointed by the President, who are—*

5 “*(1) representative of industry, including end*
6 *users likely to benefit from quantum technology and*
7 *small and medium-sized businesses and startups rep-*
8 *resenting a diversity of quantum specialties. univer-*
9 *sities, and Federal laboratories; and*

10 “*(2) qualified to provide advice and information*
11 *on quantum information science, engineering, and*
12 *technology research, development, demonstrations,*
13 *standards, STEM education, technology transfer,*
14 *commercial application, or national security and eco-*
15 *nomics concerns.”;*

16 (2) in subsection (d)(2)—

17 (A) in subparagraph (A), by striking
18 “science and technology” and inserting “science,
19 engineering, and technology”;

20 (B) by redesignating subparagraphs (D),
21 (E), (F), and (G) as subparagraphs (E), (F),
22 (G), and (H), respectively;

23 (C) by inserting after subparagraph (C) the
24 following new subparagraph:

1 “(D) other countries’ quantum programs
2 and the progress of such countries and such pro-
3 grams relative to the Program;”;

4 (D) in subparagraph (E), as so redesign-
5 nated—

6 (i) by striking “to” and inserting
7 “promote innovation, foster a robust United
8 States quantum industry, and”; and

9 (ii) by striking “science and tech-
10 nology” and inserting “science, engineering,
11 and technology”; and

12 (E) in subparagraph (F), as so redesign-
13 nated, by inserting “, including to address any
14 gaps that may exist” before the semicolon;

15 (F) in subparagraph (G), as so redesign-
16 nated, by striking “open standards for, quantum
17 information science and technology; and” and
18 inserting “international standards in open and
19 transparent standardization systems for quan-
20 tum information science, engineering, and tech-
21 nology;”;

22 (G) in subparagraph (H), as so redesign-
23 nated—

24 (i) by inserting “educational, environ-
25 mental, health,” after “legal,”; and

1 (ii) by striking the period and insert-
2 ing “,”; and

3 (H) by adding at the end the following new
4 subparagraphs:

5 “(I) the domestic and international co-
6 operation needs and goals of the Program, in-
7 cluding needs and goals related to infrastructure
8 and the supply chain of quantum information
9 science, engineering, and technology; and

10 “(J) the degree to which quantum informa-
11 tion science, engineering, and technology is en-
12 hancing or can enhance the capabilities of the
13 United States advanced industrial economy and
14 protect or optimize critical infrastructure (as
15 such term is defined in section 1016(e) of Public
16 Law 107–56 (42 U.S.C. 5195c(e)).”;

17 (3) in subsection (e)—

18 (A) by inserting “through December 31,
19 2030” after “thereafter”; and

20 (B) by adding at the end the following new
21 sentence: “In the first such report required after
22 the date of the enactment of this sentence, the
23 Advisory Committee shall assess the advisability
24 and feasibility of establishing a quantum com-
25 munications corridor in which Federal labora-

1 *tories, institutions of higher education, and other*
 2 *entities conducting quantum information science,*
 3 *engineering, and technology research are con-*
 4 *necting via quantum communication networks ca-*
 5 *pable of rapidly and securely transmitting large*
 6 *quantities of information.”; and*

7 *(4) by amending subsection (g) to read as fol-*
 8 *lows:*

9 “(g) *FACA EXEMPTION.*—*The President shall charter*
 10 *the Advisory Committee in accordance with chapter 10 of*
 11 *title 5, United States Code (commonly referred to as the*
 12 *‘Federal Advisory Committee Act’), except that the Advisory*
 13 *Committee shall be exempt from section 1013 of such title.”.*

14 **SEC. 8. SUBCOMMITTEE ON THE ECONOMIC AND SECURITY**
 15 **IMPLICATIONS OF QUANTUM INFORMATION**
 16 **SCIENCE.**

17 *Section 105 of the National Quantum Initiative Act*
 18 *(15 U.S.C. 8814a) is amended—*

19 *(1) in subsection (b)—*

20 *(A) in paragraph (10), by striking “and”*
 21 *after the semicolon;*

22 *(B) by redesignating paragraph (11) as*
 23 *paragraph (14); and*

24 *(C) by inserting after paragraph (10) the*
 25 *following new paragraphs:*

1 “(11) the Department of Health and Human
2 Services;

3 “(12) the Department of State;

4 “(13) the National Aeronautics and Space Ad-
5 ministration; and”;

6 (2) in subsection (c)—

7 (A) in paragraph (1), by striking “informa-
8 tion science” and inserting “information science,
9 engineering, and technology”;

10 (B) in paragraph (2), by inserting “or to
11 supply chains” before the semicolon;

12 (C) in paragraph (3), by inserting “or sup-
13 ply chains” before the semicolon;

14 (D) in paragraph (5)—

15 (i) by inserting “and engineering”
16 after “quantum information science”; and

17 (ii) by inserting “any” before “export
18 controls”;

19 (E) in paragraph (6), by striking “informa-
20 tion science” and inserting “information science,
21 engineering, and technology”;

22 (F) in paragraph (7), by striking “and”
23 after the semicolon;

24 (G) in paragraph (8)—

1 (i) by inserting “nonprofit research or-
2 ganizations,” after “universities,”; and

3 (ii) by striking the period and insert-
4 ing a semicolon; and

5 (H) by adding at the end the following new
6 paragraphs:

7 “(9) in coordination with the Subcommittee on
8 Quantum Information Science, identify opportunities
9 to increase coordination between civilian, military,
10 and intelligence quantum research entities, reduce un-
11 necessary duplicative quantum research activities,
12 and facilitate collaboration between quantum research
13 agencies with specialized capabilities or expertise in
14 one or more aspects of quantum information science,
15 engineering, and technology; and

16 “(10) recommend strategies for attracting and
17 retaining students and scholars with expertise in
18 quantum related fields to Federal departments and
19 agencies.”.

20 **SEC. 9. INTERNATIONAL QUANTUM COOPERATION STRAT-**
21 **EGY.**

22 *The National Quantum Initiative Act is amended by*
23 *inserting after section 105 the following new section:*

1 **“SEC. 105A. INTERNATIONAL QUANTUM COOPERATION**
2 **STRATEGY.**

3 “(a) *STRATEGY REQUIRED.*—Not later than one year
4 after the date of the enactment of this section, the Director
5 of the Office of Science and Technology Policy, in consulta-
6 tion with the Secretary of Commerce, the Secretary of State,
7 the Secretary of Energy, the Director of the National
8 Science Foundation, and the heads of other Federal agen-
9 cies, as appropriate, shall develop and submit to the Com-
10 mittee on Commerce, Science, and Transportation, the
11 Committee on Energy and Natural Resources, and the Com-
12 mittee on Foreign Relations of the Senate, and the Com-
13 mittee on Science, Space, and Technology and the Com-
14 mittee on Foreign Affairs of the House of Representatives
15 a strategy to—

16 “(1) *establish collaborative international part-*
17 *nerships, including co-funded international programs,*
18 *to advance research and development, testing and*
19 *evaluation, commercialization, and interoperability*
20 *in quantum information science, engineering, and*
21 *technology with allies and partners of the United*
22 *States, and other countries, when in the security,*
23 *strategic, technological, and scientific interests of the*
24 *United States;*

25 “(2) *ensure continued United States participa-*
26 *tion in bilateral and multilateral efforts to advance*

1 *quantum information science, engineering, and tech-*
2 *nology on the international stage;*

3 “(3) *promote the integrity and impartiality of*
4 *international standards organizations and processes*
5 *related to quantum information science, engineering,*
6 *and technology; and*

7 “(4) *ensure ethical application of quantum in-*
8 *formation science, engineering, and technology to pro-*
9 *tect civil liberties and basic human rights.*

10 “(b) *DESIGNATION.—The strategy under subsection*
11 *shall be known as the ‘International Quantum Cooperation*
12 *Strategy’ (in this section referred to as the ‘Strategy’).*

13 “(c) *ELEMENTS.—In the development of the Strategy,*
14 *the Director of the Office of Science and Technology Policy,*
15 *the National Quantum Coordination Office, the Sub-*
16 *committee on Quantum Information Science, the Sub-*
17 *committee on the Economic and Security Implications, and*
18 *the relevant agencies should consider the following:*

19 “(1) *The establishment of international partner-*
20 *ships to advance research and development in quan-*
21 *tum information science, engineering, and technology.*

22 “(2) *Key partners that are allies of the United*
23 *States and have demonstrated unique capabilities in*
24 *one or more areas of quantum information science,*
25 *engineering, and technology.*

1 “(3) *Efforts and plans to address risks to the na-*
2 *tional security and economic interests of the United*
3 *States during development and deployment of quan-*
4 *tum technologies worldwide, including plans for dip-*
5 *lomatic engagement with allies and partners, and*
6 *other countries.*

7 “(4) *Efforts and plans to promote responsible*
8 *global development and deployment of quantum tech-*
9 *nologies, including through international engagement*
10 *and leadership in the development of international*
11 *standards.*

12 “(5) *Efforts and plans to develop, attract, and*
13 *retain international talent.*

14 “(6) *The ability and risks of domestic manufac-*
15 *turers and suppliers and those of allies and partners*
16 *of the United States to meet the needs of the global*
17 *quantum supply chain, including raw materials such*
18 *as Helium-3, plans for engagement with allies and*
19 *partners, manufacturers, and suppliers, and options*
20 *to mitigate gaps and vulnerabilities in the global*
21 *quantum supply chain.*

22 “(7) *A plan to safeguard research and technology*
23 *supported through international cooperation, as ap-*
24 *propriate, in whole or in part, including in quantum*
25 *technologies critical to national security, from malign*

1 *influence, theft, or exfiltration by foreign entities of*
2 *concern.*

3 “(8) *As necessary, a description of such legisla-*
4 *tive or administrative action needed to carry out the*
5 *Strategy.*

6 “(d) *BRIEFING.—Not later than 30 days after the date*
7 *on which the Strategy is completed, the Director shall brief*
8 *the committees specified in subsection (a) on the Strategy.”.*

9 **SEC. 10. SUNSET.**

10 *Section 106(a) of the National Quantum Initiative Act*
11 *(15 U.S.C. 8815(a)) is amended to read as follows:*

12 “(a) *IN GENERAL.—Except as provided in subsection*
13 *(b), the authority to carry out sections 101, 102, 103, 104,*
14 *and 105 shall terminate on December 30, 2030.”.*

15 **SEC. 11. NATIONAL INSTITUTE OF STANDARDS AND TECH-**
16 **NOLOGY ACTIVITIES AND QUANTUM CONSOR-**
17 **TIUM.**

18 *Section 201 of the National Quantum Initiative Act*
19 *(15 U.S.C. 8831) is amended—*

20 *(1) in subsection (a)—*

21 *(A) in paragraph (1)—*

22 *(i) by striking “basic and applied”;*

23 *and*

1 (ii) by striking “science and tech-
2 nology” and inserting “science, engineering,
3 and technology”;

4 (B) in paragraph (2)—

5 (i) by inserting “attract, educate, and”
6 before “train”; and

7 (ii) by striking “science and tech-
8 nology” and inserting “science, engineering,
9 and technology”;

10 (C) by amending paragraph (3) to read as
11 follows:

12 “(3) shall carry out research to facilitate the de-
13 velopment and standardization of quantum cryptog-
14 raphy, post-quantum cryptography (as such term is
15 defined in section 3 of the Quantum Computing Cy-
16 bersecurity Preparedness Act (6 U.S.C. 1526 note;
17 Public Law 117–260)), and practices to replace cryp-
18 tographic keys or algorithms with minimal disrup-
19 tion to current applications and systems;”.

20 (D) by amending paragraph (4) to read as
21 follows:

22 “(4) shall carry out research, development, and
23 demonstration projects, as appropriate, to facilitate
24 the development and standardization of quantum net-
25 working, communications, computing, metrology,

1 *sensing technologies and quantum applications, in-*
2 *cluding quantum supporting technologies, such as ar-*
3 *tificial intelligence;”.*

4 *(E) by redesignating paragraphs (5), (6),*
5 *and (7) as paragraphs (8), (9), and (11), respec-*
6 *tively;*

7 *(F) by inserting the following after para-*
8 *graph (4) the following new paragraphs:*

9 *“(5) shall carry out research to support the*
10 *measurement of comparative performance and*
11 *progress of quantum technologies, including, as prac-*
12 *ticable, technology readiness assessments of quantum*
13 *technologies;*

14 *“(6) shall promote United States participation*
15 *in international standards organizations related to*
16 *quantum information science, engineering, and tech-*
17 *nology;*

18 *“(7) shall establish or expand partnerships with*
19 *the public sector and private sector to—*

20 *“(A) accelerate the development of domestic*
21 *quantum supply chain and supply chain-sup-*
22 *porting technologies; and*

23 *“(B) reduce quantum supply chain*
24 *vulnerabilities;”;*

1 (G) in paragraph (8), as so redesignated, by
2 striking “infrastructure” and inserting “, com-
3 munications, sensing, and computing”;

4 (H) in paragraph (9), as so redesignated—

5 (i) by inserting “non-profit research
6 organizations,” after “universities,”; and

7 (ii) by striking “and engineering; and”
8 and inserting “, engineering, and tech-
9 nology and expanding the domestic STEM
10 workforce;”; and

11 (I) by inserting after paragraph (9) the fol-
12 lowing the following new paragraph:

13 “(10) shall establish such infrastructure as is
14 necessary to carry out title II; and”;

15 (2) in subsection (b)—

16 (A) in paragraph (1)—

17 (i) by striking “future” and inserting
18 “research”; and

19 (ii) by striking “science and tech-
20 nology” and inserting “science, engineering,
21 and technology”;

22 (B) in paragraph (2)—

23 (i) by amending subparagraph (A) to
24 read as follows:

1 “(A) to gather and assess information on
2 the quantum industry to address the needs iden-
3 tified in paragraph (1);”;

4 (ii) by striking subparagraphs (B) and
5 (C) and inserting the following new sub-
6 paragraphs:

7 “(B) to provide recommendations regarding
8 how the National Institute of Standards and
9 Technology, the Program, and other Federal
10 agencies, as appropriate, can address the gaps in
11 the research necessary to meet the needs identi-
12 fied in paragraph (1) and accelerate real-world
13 uses of quantum information science, engineer-
14 ing, and technology;

15 “(C) to identify enabling technologies and
16 the relevant supply chain essential to foster re-
17 search and industrial competitiveness in quan-
18 tum information science, engineering, and tech-
19 nology, and communicate findings to Federal
20 agencies and other domestic and international
21 stakeholders;

22 “(D) to assess and identify key areas for es-
23 tablishing, expanding, or developing inter-
24 national partnerships that will facilitate United

1 *States quantum-related business engagement;*
2 *and*

3 “(E) to provide recommendations on how
4 the National Institute of Standards and Tech-
5 nology, the Program, and other Federal agencies,
6 as appropriate, can incorporate small and me-
7 dium-sized businesses and startups into Federal
8 quantum activities and promote the success of
9 small and medium-sized startups.”;

10 (C) in paragraph (3)—

11 (i) by striking “Not later than 2 years
12 after the date of enactment of this Act, the”
13 and inserting “The”; and

14 (ii) by inserting “periodically, but not
15 less than every five years,” after “shall”;
16 and

17 (D) by adding at the end the following new
18 paragraph:

19 “(4) COORDINATION.—As appropriate, the con-
20 sortium is encouraged to engage with Federal agencies
21 that fund research, have a mission to transition or
22 translate research results to practical quantum appli-
23 cations, or have a mission that could benefit from the
24 development of quantum technologies, to inform and
25 accelerate progress in such areas.”; and

1 (3) *by striking subsection (c) and inserting the*
2 *following new subsections:*

3 “(c) *INTERNATIONAL QUANTUM RESEARCH AND ME-*
4 *TROLOGY.—*

5 “(1) *IN GENERAL.—The Director of the National*
6 *Institute of Standards and Technology, in coordina-*
7 *tion with the Secretary of State and the Director of*
8 *the National Science Foundation, shall promote, es-*
9 *tablish, and support international quantum informa-*
10 *tion science, engineering, and technology research,*
11 *metrology research, and standardization, as appro-*
12 *priate, to enhance international cooperation, meet*
13 *United States commitments, and support United*
14 *States engagement in international standards for*
15 *quantum information science, engineering, and tech-*
16 *nology.*

17 “(2) *ALIGNMENT.—In carrying out this section,*
18 *the Director of the National Institute of Standards*
19 *and Technology shall ensure alignment with the Na-*
20 *tional Quantum Information Science Strategy and*
21 *the U.S. Government National Standards Strategy for*
22 *Critical and Emerging Technology, or successor strat-*
23 *egies.*

24 “(3) *RESTRICTIONS.—*

1 “(A) *CONFUCIUS INSTITUTE*.—None of the
2 *funds made available under this section may be*
3 *obligated or expended to an institution of higher*
4 *education that maintains a contract or agree-*
5 *ment between such institution and a Confucius*
6 *Institute or any successor of a Confucius Insti-*
7 *tute.*

8 “(B) *FOREIGN COUNTRIES OR ENTITIES OF*
9 *CONCERN*.—None of the funds made available
10 under this section may be obligated or expended
11 to promote, establish, or finance quantum re-
12 search activities between a United States entity
13 and a foreign country of concern or foreign enti-
14 ty of concern, except such restriction shall not
15 apply to participation by awardees in consensus-
16 based international standardization activities.

17 “(d) *POST QUANTUM CRYPTOGRAPHY DEPLOYMENT*.—

18 “(1) *IN GENERAL*.—The Director of the National
19 *Institute of Standards and Technology, in consulta-*
20 *tion with the Secretary of Homeland Security, the*
21 *heads of Sector Risk Management Agencies (as such*
22 *term is defined in section 2200 of the Homeland Se-*
23 *curity Act of 2002 (6 U.S.C. 650)), and private sector*
24 *entities, as appropriate, shall promote the voluntary*
25 *development, adoption, and deployment of standards*

1 *relating to post-quantum cryptography (as such term*
2 *is defined in section 3 of the Quantum Computing*
3 *Cybersecurity Preparedness Act (6 U.S.C. 1526 note;*
4 *Public Law 117–260)), including by—*

5 *“(A) disseminating and making publicly*
6 *available guidance and resources to help organi-*
7 *zations adopt and deploy standards relating to*
8 *post-quantum cryptography and minimize dis-*
9 *ruptions to current applications and systems*
10 *caused by cryptographic updates;*

11 *“(B) providing technical assistance, as*
12 *practicable, to entities that are at high risk of*
13 *quantum cryptanalytic attacks, such as entities*
14 *determined to be critical infrastructure (as such*
15 *term is defined in section 1016(e) of Public Law*
16 *107–56 (42 U.S.C. 5195c(e))) or digital infra-*
17 *structure providers; and*

18 *“(C) conducting such other activities as de-*
19 *termined necessary by the Director to promote*
20 *the development, adoption, and deployment*
21 *across the United States of standards relating to*
22 *post-quantum cryptography.*

23 *“(2) GRANT PROGRAM.—*

24 *“(A) IN GENERAL.—Subject to the avail-*
25 *ability of appropriations and after the date on*

1 *which the Director of National Institute of*
2 *Standards and Technology has issued standards*
3 *relating to post-quantum cryptography, the Di-*
4 *rector may establish a program to identify and*
5 *provide technical assistance through the award of*
6 *grants to entities that are at high risk of quan-*
7 *tum cryptanalytic attacks, including by grant-*
8 *ing funds for the adoption of such standards and*
9 *the remediation of quantum-related*
10 *vulnerabilities.*

11 “(B) *USE OF FUNDS.*—*Grants awarded to*
12 *entities under this paragraph may be used to*
13 *cover reasonable costs, up to a specified amount*
14 *established by the Director of the National Insti-*
15 *tute of Standards and Technology, for activities*
16 *to adopt standards relating to post-quantum*
17 *cryptographic and remediate quantum-related*
18 *vulnerabilities.*

19 “(C) *GUIDANCE.*—*The Director of the Na-*
20 *tional Institute of Standards and Technology*
21 *may develop, and periodically update, guidance,*
22 *including relating to eligibility, application dis-*
23 *closure requirements, grant amount and dura-*
24 *tion, and any additional requirements regarding*
25 *the award of grants under this paragraph.*

1 “(D) *CONSULTATION.*—If the program de-
2 scribed in this paragraph is established, the Di-
3 rector of the National Institute of Standards and
4 Technology shall consult with the Director of the
5 Cybersecurity and Infrastructure Security Agen-
6 cy of the Department of Homeland Security, the
7 heads of other Sector Risk Management Agencies,
8 and appropriate representatives of private sector
9 entities, including nonprofit organizations, to
10 share information regarding the grant program
11 under this paragraph and guidance developed
12 and updated under subparagraph (C).

13 “(e) *FUNDING.*—Of the funds authorized to be appro-
14 priated for the National Institute of Standards and Tech-
15 nology pursuant to section 10211 of the Research and Devel-
16 opment, Competition, and Innovation Act (Public Law
17 117–167) for scientific and technical research and services
18 laboratory activities, there is authorized to be appropriated
19 to the Director of the National Institute of Standards and
20 Technology to carry out this section up to \$85,000,000 for
21 each of fiscal years 2024 through 2027.”.

22 **SEC. 12. NATIONAL INSTITUTE OF STANDARDS AND TECH-**
23 **NOLOGY QUANTUM CENTERS.**

24 Title II of the National Quantum Initiative Act is
25 amended by adding at the end the following new sections:

1 **“SEC. 202. NATIONAL INSTITUTE OF STANDARDS AND**
2 **TECHNOLOGY QUANTUM CENTERS.**

3 *“(a) ESTABLISHMENT.—*

4 *“(1) IN GENERAL.—Subject to the availability of*
5 *appropriations, the Director of the National Institute*
6 *of Standards and Technology, in consultation with*
7 *the heads of other Federal departments and agencies,*
8 *as appropriate, shall carry out a program to establish*
9 *and operate at least one, but not more than three,*
10 *centers to accelerate research, development, deploy-*
11 *ment, and standardization of quantum information*
12 *science, engineering, and technology.*

13 *“(2) PROGRAM DETAILS.—*

14 *“(A) COMPETITIVE, MERIT-REVIEWED PROC-*
15 *CESS.—The centers shall be established through a*
16 *competitive, merit-reviewed process.*

17 *“(B) APPLICATIONS.—An eligible applicant*
18 *described in subparagraph (C) shall submit to*
19 *the Director of the National Institute of Stand-*
20 *ards and Technology an application at such*
21 *time, in such manner, and containing such in-*
22 *formation as the Director determines to be ap-*
23 *propriate.*

24 *“(C) ELIGIBLE APPLICANTS.—Eligible ap-*
25 *plicants described in this subparagraph are the*
26 *following:*

1 “(i) *Institutions of higher education.*

2 “(ii) *Nonprofit organizations.*

3 “(iii) *Multi-institutions collaborations,*
4 *including multiple types of research institu-*
5 *tions, private sector entities, Federal labora-*
6 *tories, and nonprofit organizations, or a*
7 *consortia thereof.*

8 “(iv) *Any other entity the Director de-*
9 *termines appropriate.*

10 “(3) *SELECTION OF TOPICS.—The Director of the*
11 *National Institute of Standards and Technology shall*
12 *solicit proposals and prioritize the following topics in*
13 *the initial selection of centers, subject to merit-review:*

14 “(A) *Quantum sensing and measurement.*

15 “(B) *Quantum engineering.*

16 “(b) *REQUIREMENTS.—To the maximum extent prac-*
17 *ticable, centers developed, constructed, operated, or main-*
18 *tained under this section shall serve the mission of the Na-*
19 *tional Institute of Standards and Technology, for the benefit*
20 *of the broader United States quantum information science*
21 *community, to develop processes for the following pur-*
22 *poses—*

23 “(1) *Advancing research and standardization in*
24 *quantum information science, engineering, and tech-*
25 *nology.*

1 “(2) *Advancing technology transfer.*

2 “(3) *Improving the competitiveness of the United*
3 *States.*

4 “(c) *COORDINATION.—The Director of the National In-*
5 *stitute of Standards and Technology shall ensure coordina-*
6 *tion, and avoid unnecessary duplication of, the activities*
7 *carried out under this section with existing activities of the*
8 *Institute, other activities carried out under this Act, and*
9 *other related programs, as appropriate.*

10 “(d) *SELECTION AND DURATION.—*

11 “(1) *IN GENERAL.—The centers established under*
12 *this section are authorized to carry out activities for*
13 *a period of five years.*

14 “(2) *RENEWAL.—Each center established under*
15 *this section may be renewed for an additional period*
16 *of five years following a successful merit-based review*
17 *by the Director.*

18 “(3) *TERMINATION.—Consistent with the au-*
19 *thorities of the National Institute of Standards and*
20 *Technology, the Director of the National Institute of*
21 *Standards and Technology may terminate an under-*
22 *performing center for cause during the performance*
23 *period.*

24 “(e) *FUNDING.—The Director of the National Institute*
25 *of Standards and Technology shall allocate up to*

1 \$18,000,000 for each center established under this section
2 for each of fiscal years 2024 through 2028, subject to the
3 availability of appropriations. Amounts made available to
4 carry out this section shall be derived from amounts appro-
5 priated or otherwise made available to the National Insti-
6 tute of Standards and Technology.

7 **“SEC. 203. RESEARCH SECURITY.**

8 *“The activities authorized under title II shall be ap-
9 plied in a manner consistent with subtitle D of title VI of
10 the Research and Development, Competition, and Innova-
11 tion Act (enacted as division B of Public Law 117–167;
12 42 U.S.C. 19231 et seq.).”*

13 **SEC. 13. NATIONAL SCIENCE FOUNDATION QUANTUM IN-
14 FORMATION SCIENCE RESEARCH AND EDU-
15 CATION ACTIVITIES.**

16 *Section 301 of the National Quantum Initiative Act
17 (15 U.S.C. 8841) is amended—*

18 *(1) in the heading, by inserting “, **ENGINEER-
19 ING, AND TECHNOLOGY**” after “**SCIENCE**”;*

20 *(2) in subsection (a)—*

21 *(A) by striking “basic”; and*

22 *(B) by striking “science and engineering”
23 and inserting “science, engineering, and tech-
24 nology”;*

25 *(3) in subsection (b)—*

1 (A) in paragraph (1)—

2 (i) in subparagraph (A)—

3 (I) by striking “basic”; and

4 (II) by striking “science and engi-
5 neering” and inserting “science, engi-
6 neering, and technology”; and

7 (ii) in subparagraph (B)—

8 (I) by striking “human resources”
9 and inserting “education and work-
10 force”; and

11 (II) by striking “science and engi-
12 neering” and inserting “science, engi-
13 neering, and technology”; and

14 (B) in paragraph (2)—

15 (i) in subparagraph (A)—

16 (I) in clause (i)—

17 (aa) by striking “science and
18 engineering” and inserting
19 “science, engineering, and tech-
20 nology”;

21 (bb) by inserting “K–12, vo-
22 cational,” before “undergraduate”;
23 and

24 (cc) by striking “and” after
25 the semicolon;

1 (II) in clause (ii), by inserting
2 “and” after the semicolon; and

3 (III) by adding at the end the fol-
4 lowing new clause:

5 “(iii) to pursue research at the fron-
6 tiers of quantum information science, engi-
7 neering, and technology, and explore solu-
8 tions to important challenges for the devel-
9 opment, application, and commercialization
10 of quantum technologies;”;

11 (ii) in subparagraph (B), by striking
12 “science and engineering” and inserting
13 “science, engineering, and technology”; and

14 (iii) in subparagraph (C), by striking
15 “science and engineering” and inserting
16 “science, engineering, and technology”;

17 (iv) in subparagraph (D), by striking
18 “and” after the semicolon;

19 (v) in subparagraph (E), by striking
20 the period and inserting “; and”; and

21 (vi) by adding at the end the following
22 new subparagraph:

23 “(F) providing infrastructure to support
24 academic quantum information science, engi-
25 neering, and technology, including through exist-

1 *ing infrastructure programs and new activi-*
2 *ties.”;*

3 *(4) by amending subsection (c) to read as fol-*
4 *lows:*

5 *“(c) STUDENT TRAINEESHIPS, FELLOWSHIPS, AND*
6 *OTHER MODELS.—*

7 *“(1) IN GENERAL.—The Director of the National*
8 *Science Foundation, in consultation with heads of*
9 *Federal agencies the Director considers appropriate,*
10 *shall award grants to institutions of higher education*
11 *or eligible nonprofit organizations (or consortia there-*
12 *of) to increase capacity and broaden participation,*
13 *including through provisioning of experiential oppor-*
14 *tunities, where appropriate, in quantum information*
15 *science, engineering, and technology and other related*
16 *disciplines.*

17 *“(2) QUANTUM TRAINEESHIPS.—The Director of*
18 *the National Science Foundation may establish or use*
19 *existing programs to make awards to institutions of*
20 *higher education or nonprofit organizations (or con-*
21 *sortia thereof) to provide traineeships to graduate stu-*
22 *dents at institutions of higher education within the*
23 *United States who are citizens of the United States*
24 *and who choose or plan to pursue masters or doctoral*
25 *degrees in quantum information science, engineering,*

1 *and technology, or related fields, and by providing*
2 *students with opportunities for research experiences*
3 *in government or industry related to such students’*
4 *quantum studies.*

5 “(3) *QUANTUM FELLOWSHIPS AND SCHOLAR-*
6 *SHIPS.—*

7 “(A) *IN GENERAL.—The Director of the Na-*
8 *tional Science Foundation may establish or use*
9 *existing programs to support fellowships and*
10 *scholarships for students at institutions of higher*
11 *education for the purpose of increasing quantum*
12 *information science, engineering, and technology*
13 *exposure for undergraduate and graduate STEM*
14 *students and increasing post-graduation employ-*
15 *ment opportunities for STEM students.*

16 “(B) *REQUIREMENTS.—Eligible partici-*
17 *pants in the fellowship and scholarship program*
18 *shall—*

19 “(i) *be enrolled in or have graduated*
20 *from a STEM degree program at a domestic*
21 *institution of higher education; and*

22 “(ii) *have taken at least one quantum-*
23 *science or quantum-relevant course as part*
24 *of their degree programs.*

1 “(C) *CONSIDERATIONS.—Eligible fellow-*
2 *ships and scholarships may include temporary*
3 *quantum-related positions at State or Federal*
4 *agencies, national laboratories, private sector en-*
5 *tities, institutions of higher education, the Quan-*
6 *tum Centers and Institute established in sections*
7 *202, 302, 402, and 502, or other quantum-rel-*
8 *evant entities, as determined appropriate by the*
9 *Director.*

10 “(D) *COMPETITIVE AWARDS.—Fellowships*
11 *and scholarships shall be competitively awarded*
12 *through a merit-review process. The Director of*
13 *the National Science Foundation may prioritize*
14 *fellowships that include an industry partner that*
15 *provides financial assistance to the applicant for*
16 *direct or indirect costs.*

17 “(4) *QUANTUM RESEARCH EXPERIENCES FOR*
18 *UNDERGRADUATES.—The Director of the National*
19 *Science Foundation shall seek to increase opportuni-*
20 *ties for quantum research for undergraduate students*
21 *by encouraging proposals in quantum information*
22 *science, engineering, and technology, through the re-*
23 *search experiences for undergraduates pursuant to*
24 *section 514 of the America COMPETES Reauthoriza-*
25 *tion Act of 2010 (42 U.S.C. 1862p–6).*

1 “(5) *CO-OPERATIVE EDUCATION PROGRAMS.*—
2 *The Director of the National Science Foundation may*
3 *establish or use existing programs to support coopera-*
4 *tive education programs between institutions of high-*
5 *er education and employers that increase opportuni-*
6 *ties for undergraduate students to acquire experiential*
7 *learning and professional experiences in quantum in-*
8 *formation sciences, engineering, and technology.*

9 “(6) *PARTNERSHIPS.*—*In carrying out the ac-*
10 *tivities under this subsection, the Director of the Na-*
11 *tional Science Foundation shall encourage awardees*
12 *to partner with relevant Federal agencies, Federal*
13 *laboratories, industry and other private sector organi-*
14 *zations, and nonprofit organizations to facilitate the*
15 *expansion of workforce pathways and hands-on learn-*
16 *ing experiences.”;*

17 (5) *in subsection (d)*—

18 (A) *in the subsection heading, by striking*
19 “*QISE*” *and inserting “QISET”;*

20 (B) *in paragraph (1)*—

21 (i) *by striking “information science*
22 *and engineering (referred to in this sub-*
23 *section as ‘QISE’)” and inserting “informa-*
24 *tion science, engineering, and technology*

1 (referred to in this subsection as *QISET*)”;

2 and

3 (ii) by inserting “and career and tech-
4 nical education entities” after “colleges”;

5 (C) in paragraph (2)—

6 (i) in subparagraph (A), by striking
7 “*QISE*” and inserting “quantum informa-
8 tion science, engineering, and technology”;

9 (ii) in subparagraph (D), by inserting
10 “, engineering, and technology” after
11 “science”;

12 (iii) in subparagraph (D), by inserting
13 “, including those relevant to emerging tech-
14 nologies, such as artificial intelligence,
15 microelectronics, and nano technology” after
16 “fields”.

17 (iv) by redesignating subparagraphs
18 (E) and (F) as subparagraphs (F) and (H),
19 respectively;

20 (v) by inserting after subparagraph
21 (D) the following new subparagraph:

22 “(E) *Informal education methods to en-
23 hance experiences of students of all ages with
24 quantum information science, engineering, and
25 technology concepts and applications.*”;

1 (vi) by inserting after subparagraph
2 (F), as so redesignated, the following new
3 subparagraph:

4 “(G) *Methods to introduce security and*
5 *other potential societal dimensions associated*
6 *with quantum information science, engineering,*
7 *and technology into STEM curricula.”; and*

8 (vii) in subparagraph (H), as so redesi-
9 gnated, by inserting “, engineering, and
10 technology” after “science”;

11 (D) in paragraph (3), by striking “QISE”
12 and inserting “quantum information science, en-
13 gineering, and technology”; and

14 (E) by striking paragraph (4); and

15 (6) by adding at the end the following new sub-
16 sections:

17 “(e) *QUANTUM RESEARCH EXPERIENCES FOR TEACH-*
18 *ERS.—The Director of the National Science Foundation*
19 *shall seek to increase opportunities to engage educators,*
20 *principals, or other school leaders of K-12 students in pro-*
21 *fessional learning opportunities to enhance quantum infor-*
22 *mation science, engineering, and technology knowledge, in-*
23 *cluding by—*

24 “(1) *providing hands-on training and research*
25 *opportunities for such educators at Federal Labora-*

1 *tories, institutions of higher education, or in indus-*
2 *try; and*

3 *“(2) developing best practices.*

4 *“(f) EXPANDING CAPACITY IN QUANTUM INFORMATION*
5 *SCIENCE, ENGINEERING, AND TECHNOLOGY (QISET).—*

6 *“(1) IN GENERAL.—The Director of the National*
7 *Science Foundation, in consultation with the heads of*
8 *Federal agencies the Director considers appropriate,*
9 *shall make awards on a competitive, merit-reviewed*
10 *basis to eligible institutions of higher education or eli-*
11 *gible nonprofit organizations (or consortia thereof) to*
12 *increase research capacity, education and infrastruc-*
13 *ture capacity, and broaden participation in quantum*
14 *information science, engineering, and technology and*
15 *related disciplines, including by—*

16 *“(A) supporting curriculum development in*
17 *quantum information science, engineering, and*
18 *technology as described in section 301(d) of the*
19 *National Quantum Initiative Act (15 U.S.C.*
20 *8841(d));*

21 *“(B) building upon the activities carried*
22 *out under the Next Generation Quantum Leaders*
23 *Pilot Program authorized under section 10661(f)*
24 *of the Research and Development, Competition,*

1 *and Innovation Act (Public Law 117–167; 42*
2 *U.S.C. 19261(f)); and*

3 “(C) *leveraging the readiness for the in-*
4 *volvement of local research and education com-*
5 *munities to secure a talent pipeline in quantum*
6 *information science, engineering, and technology*
7 *to meet the workforce needs of industry, govern-*
8 *ment, and academia.*

9 “(2) *COLLABORATIONS.—A collaboration receiv-*
10 *ing an award under this subsection may include in-*
11 *stitutions of higher education, nonprofit organiza-*
12 *tions, and private sector entities.*

13 “(3) *ELIGIBLE INSTITUTION OF HIGHER EDU-*
14 *CATION DEFINED.—In this subsection, the term ‘eligi-*
15 *ble institution of higher education’ means an institu-*
16 *tion of higher education, that, according to the data*
17 *published by the National Center for Science and En-*
18 *gineering Statistics, is not, on average, among the top*
19 *100 institutions in Federal research and development*
20 *expenditures during the 3- year period prior to the*
21 *year of the award.*

22 “(4) *REQUIREMENTS.—To receive an award*
23 *under this subsection, an eligible institution shall sub-*
24 *mit to the Director of the National Science Founda-*
25 *tion an application that includes the following:*

1 “(A) *A plan to sustain proposed activities*
2 *beyond the duration of the award.*

3 “(B) *Proposed quantum information*
4 *science, engineering, and technology disciplines*
5 *and focus areas the eligible institution is pre-*
6 *pared to engage in to significantly build up its*
7 *quantum information science, engineering, and*
8 *technology research and education capacity.*

9 “(C) *A plan for education and workforce de-*
10 *velopment, which may include K-12 and post-*
11 *secondary education programs and activities,*
12 *workforce training and career and technical edu-*
13 *cation programs and activities, undergraduate,*
14 *graduate, and postdoctoral education, and infor-*
15 *mal education programs and activities.*

16 “(5) *ACTIVITIES.—Awards under this subsection*
17 *to support research and related activities may include*
18 *the activities relating to the following:*

19 “(A) *Development or expansion of research*
20 *programs in disciplines and focus areas specified*
21 *in paragraph (4)(B).*

22 “(B) *Faculty recruitment and professional*
23 *development in disciplines and focus areas speci-*
24 *fied in paragraph (4)(B).*

1 “(C) Bridge programs focused on preparing
2 post-baccalaureate students for graduate pro-
3 grams in quantum information science, engi-
4 neering, and technology.

5 “(D) To build research capacity and infra-
6 structure at an eligible institution in disciplines
7 and focus areas specified in paragraph (4)(B).

8 “(E) An assessment of capacity-building
9 and research infrastructure needs identified in
10 paragraph (4)(B).

11 “(F) Administrative research development
12 support.

13 “(G) Other activities necessary to build re-
14 search capacity in quantum information science,
15 engineering, and technology.

16 “(6) ADDITIONAL CONSIDERATIONS.—In making
17 awards under this subsection, the Director of the Na-
18 tional Science Foundation may also consider the fol-
19 lowing:

20 “(A) The extent to which the eligible appli-
21 cant will support students from diverse back-
22 grounds, including first-generation under-
23 graduate students.

24 “(B) The geographic and institutional di-
25 versity of eligible applicants.

1 “(C) *How the eligible applicant can lever-*
2 *age public-private partnerships and existing re-*
3 *search partnerships with Federal agencies.*

4 “(7) *DUPLICATION.—The Director of the Na-*
5 *tional Science Foundation shall ensure awards made*
6 *under this subsection are complimentary to and not*
7 *duplicative of existing programs.*

8 “(g) *FACULTY MID-CAREER DEVELOPMENT*
9 *AWARDS.—The Director of the National Science Founda-*
10 *tion may provide awards to support mid-career scientists*
11 *and faculty to upgrade, develop, or acquire essential re-*
12 *search instruments to start new research activities, or ex-*
13 *pand existing activities, focused on quantum information*
14 *science, engineering and technology.*

15 “(h) *INTERNATIONAL RESEARCH ON QUANTUM INFOR-*
16 *MATION SCIENCE, ENGINEERING, AND TECHNOLOGY.—*

17 “(1) *IN GENERAL.—The Director of the National*
18 *Science Foundation, in coordination with the Sec-*
19 *retary of State and the Secretary of Commerce, shall*
20 *support international quantum information science,*
21 *engineering, and technology research, as appropriate,*
22 *to enhance international cooperation and meet United*
23 *States commitments, including as part of the terms*
24 *and conditions of bilateral or multilateral quantum*

1 *information science, engineering, and technology re-*
2 *search agreements.*

3 “(2) *ALIGNMENT.*—*In carrying out this sub-*
4 *section, the Director of the National Science Founda-*
5 *tion shall ensure alignment with the national Quan-*
6 *tum Information Strategy in accordance with Execu-*
7 *tive Order 14073 or successor strategies.*

8 “(3) *PRIORITY.*—*The Director shall prioritize re-*
9 *search programs with countries that have signed a*
10 *Quantum Cooperation Statement with the United*
11 *States.*

12 “(4) *RESTRICTIONS.*—

13 “(A) *CONFUCIUS INSTITUTE.*—*None of the*
14 *funds made available under this section may be*
15 *obligated or expended to an institution of higher*
16 *education that maintains a contract or agree-*
17 *ment between such institution and a Confucius*
18 *Institute or any successor of a Confucius Insti-*
19 *tute.*

20 “(B) *FOREIGN COUNTRY OF CONCERN AND*
21 *FOREIGN ENTITY OF CONCERN.*—*None of the*
22 *funds made available under this section may be*
23 *obligated or expended to promote, establish, or fi-*
24 *nance quantum research activities between a*

1 *United States entity and a foreign country of*
2 *concern or foreign entity of concern.*

3 “(i) *UPGRADING AND IMPROVING ACCESS TO QUAN-*
4 *TUM RESEARCH RESOURCES.*—

5 “(1) *IN GENERAL.*—*In carrying out the activities*
6 *described in this section, the Director of the National*
7 *Science Foundation, in consultation with the heads of*
8 *other Federal departments and agencies, as appro-*
9 *priate, shall award grants to institutions of higher*
10 *education or eligible nonprofit organizations (or con-*
11 *sortia thereof) to upgrade research facilities and im-*
12 *prove access to research resources, such as equipment*
13 *and instrumentation, that is needed for research and*
14 *development in quantum information science, engi-*
15 *neering, and technology.*

16 “(2) *PURPOSE.*—*Grants under paragraph (1)*
17 *shall be used to facilitate quantum information*
18 *science, engineering, and technology research and de-*
19 *velopment, including by carrying out the following:*

20 “(A) *Upgrading or adding research re-*
21 *sources to accelerate the development of quantum*
22 *technologies, including capabilities focused on*
23 *addressing the roadblocks to implementation,*
24 *and meet the materials, advanced materials de-*
25 *velopment, high performance computing, hetero-*

1 *geneous computing, networking, software, data,*
2 *clean room, and device needs of the scientific*
3 *community and the quantum supply chain.*

4 “(B) *Enhancing access to equipment and*
5 *instrumentation, including at partnering insti-*
6 *tutions, by facilitating information sharing, co-*
7 *ordination, scheduling, education, and training,*
8 *including activities that provide meaningful*
9 *hands-on learning experiences for students, in-*
10 *cluding at community and technical colleges.*

11 “(C) *Enabling professional staff to support*
12 *the operation and improvement of research re-*
13 *sources used for quantum information science,*
14 *engineering, and technology.*

15 “(3) *REQUIREMENTS.—An institution of higher*
16 *education or an eligible nonprofit organization (or a*
17 *consortium thereof) and industry partners seeking*
18 *funding under this subsection shall submit to the Di-*
19 *rector of the National Science Foundation an applica-*
20 *tion at such time, in such manner, and containing*
21 *such information as the Director may require.*

22 “(j) *FUNDING.—Of the funds authorized to be appro-*
23 *priated to the National Science Foundation pursuant to*
24 *section 10303 of the Research and Development, Competi-*
25 *tion, and Innovation Act (Public Law 117–167) for re-*

1 *search and related activities, there is authorized to be ap-*
2 *propriated to the Director of the National Science Founda-*
3 *tion to carry out this section up to \$141,000,000 for each*
4 *of fiscal years 2024 through 2027.”.*

5 **SEC. 14. MULTIDISCIPLINARY CENTERS FOR QUANTUM RE-**
6 **SEARCH AND EDUCATION.**

7 *Section 302 of the National Quantum Initiative Act*
8 *(15 U.S.C. 8842) is amended—*

9 *(1) in subsection (a), by striking “5” and insert-*
10 *ing “10”;*

11 *(2) in subsection (c)—*

12 *(A) in the matter preceding paragraph (1),*
13 *by striking “basic”;*

14 *(B) in paragraph (1), by striking “science*
15 *and engineering” and inserting “science, engi-*
16 *neering, and technology”; and*

17 *(C) in paragraph (2), by striking “and en-*
18 *gineering” and inserting “, engineering, and*
19 *technology, including leveraging or expanding*
20 *activities established pursuant to section*
21 *301(d)”;*

22 *(3) in subsection (d)(2)—*

23 *(A) in subparagraph (A), by striking*
24 *“quantum science” and inserting “quantum in-*
25 *formation science, engineering, and technology”;*

1 *(B) in subparagraph (B), by inserting*
2 *“health,” after “chemistry,”;*

3 *(C) in subparagraph (C), by inserting “,*
4 *including how each participant will develop and*
5 *implement outreach activities to increase the*
6 *participation of women and other students from*
7 *groups historically underrepresented in STEM”*
8 *before the semicolon;*

9 *(D) in subparagraph (D), by striking*
10 *“and” after the semicolon;*

11 *(E) in subparagraph (E), by striking the*
12 *period and inserting “; and”; and*

13 *(F) by adding at the end the following new*
14 *subparagraph:*

15 *“(F) how the Center will participate in*
16 *international collaborations, as appropriate, to*
17 *build a trusted global research network with al-*
18 *lies and partners of the United States and other*
19 *countries that share values with the United*
20 *States, including respect for international norms*
21 *of fair competition.”;*

22 *(4) in subsection (e), by amending paragraph (2)*
23 *to read as follows:*

1 “(2) *REAPPLICATION*.—An awardee may reapply
2 for an additional, subsequent period of 5 years fol-
3 lowing a successful, merit-based review.”; and

4 (5) in subsection (f), by striking “2019 through
5 2023” and inserting “2024 through 2028”.

6 **SEC. 15. QUANTUM RESKILLING, EDUCATION, AND WORK-**
7 **FORCE (QREW) COORDINATION HUB.**

8 *Title III of the National Quantum Initiative Act (15*
9 *U.S.C. 8841 et seq.) is amended by adding at the end the*
10 *following new sections:*

11 **“SEC. 303. QUANTUM RESKILLING, EDUCATION, AND WORK-**
12 **FORCE (QREW) COORDINATION HUB.**

13 “(a) *IN GENERAL*.—The Director of the National
14 *Science Foundation, in consultation with the Director of*
15 *the National Institute of Standards and Technology, the*
16 *Secretary of Energy, and the heads of other relevant Federal*
17 *departments and agencies, as appropriate, shall make an*
18 *award to a consortium led by an institution of higher edu-*
19 *cation or an eligible nonprofit organization to establish a*
20 *Quantum Reskilling, Education, and Workforce Coordina-*
21 *tion Hub (in this section referred to as the ‘Hub’).*

22 “(b) *CONSORTIUM*.—The Hub established pursuant to
23 *subsection (a) shall include not fewer than four institutions*
24 *of higher education, including not fewer than two commu-*

1 *nity colleges, and may include career and technical schools,*
2 *nonprofit organizations, and private sector entities.*

3 “(c) *PURPOSE.*—*The purpose of this Hub shall be to—*

4 “(1) *identify and address cross-cutting workforce*
5 *development challenges in quantum information*
6 *science, engineering, and technology, and the quan-*
7 *tum industry, by serving as a national and regional*
8 *clearinghouse; and*

9 “(2) *facilitate the establishment of programs to*
10 *disseminate to institutions of higher education and*
11 *career and technical education entities model cur-*
12 *ricula, best practices, and instructional materials.*

13 “(d) *ACTIVITIES.*—*The activities of the Hub may in-*
14 *clude the following:*

15 “(1) *Testing, implementing, scaling, dissemi-*
16 *nating, and standardizing materials, methods, best*
17 *practices, and other outputs developed through activi-*
18 *ties under this Act.*

19 “(2) *Increasing the integration of quantum in-*
20 *formation science, engineering, and technology con-*
21 *tent into STEM curricula at all education levels, in-*
22 *cluding career and technical education programs.*

23 “(3) *Providing opportunities for STEM degree*
24 *students to provide feedback on quantum information*
25 *science, engineering, and technology curricula.*

1 “(4) *Facilitating post-education employment op-*
2 *portunities and workforce pathways for STEM degree*
3 *recipients in quantum-related industries, including*
4 *by facilitating opportunities for internships,*
5 *externships, fellowships, and other such activities as*
6 *determined by the Director, including through the es-*
7 *tablishment of a publicly accessible online portal.*

8 “(5) *Coordinating with quantum industry and*
9 *nonprofit entities and small and medium-sized busi-*
10 *nesses and startups to inform and enhance the quality*
11 *and availability of quantum education in STEM de-*
12 *gree programs, including through the promotion of*
13 *post-graduation opportunities for STEM students*
14 *outside the classroom to increase exposure to quantum*
15 *industries.*

16 “(6) *Supporting activities and programs to en-*
17 *hance the recruitment of students from groups histori-*
18 *cally underrepresented in STEM to pursue under-*
19 *graduate and graduate studies in quantum informa-*
20 *tion science, engineering, and technology.*

21 “(7) *Developing, testing, implementing, and co-*
22 *ordinating career development programs and strate-*
23 *gies for pre-university and university educators for*
24 *the purpose of increasing the number of quantum-in-*

1 *formed educators at all levels of education, including*
2 *by carrying out the following:*

3 “(A) *Hosting career development workshops.*

4 “(B) *Developing in-house and distance*
5 *learning career development tools for public use.*

6 “(C) *Facilitating access to related quantum*
7 *technology, tools, and resources.*

8 “(D) *Developing training, research, and*
9 *professional development programs, including in-*
10 *novative pre-service and in-service programs.*

11 “(E) *Facilitating relationships with State*
12 *and local entities to increase awareness of and*
13 *promote quantum-related career development ac-*
14 *tivities at the Hub.*

15 “(8) *Establishing a framework for performing*
16 *ongoing regular data collection and analysis for the*
17 *quantum workforce to report on trends, and perform*
18 *other activities that expand the understanding of the*
19 *current and future needs of the quantum industry,*
20 *and education capacity or readiness of the quantum*
21 *workforce. Such activities shall complement or align*
22 *with, as relevant, authorized quantum and STEM*
23 *workforce studies under section 10661(d) of the Re-*
24 *search and Development, Competition, and Innova-*
25 *tion Act (42 U.S.C. 19261(d)).*

1 “(9) *Facilitating public education and outreach*
2 *activities to enhance the understanding and aware-*
3 *ness of quantum information science, engineering,*
4 *and technology to a boarder community to satisfy*
5 *broader impact requirements of award applications.*

6 “(10) *Encouraging coordination on quantum*
7 *education in the broader STEM community.*

8 “(e) *QREW QUANTUM FELLOWSHIP PROGRAM.—Sub-*
9 *ject to the restrictions outlined in subsection (c) of section*
10 *301, the Hub may support education or policy fellowships*
11 *for students at entities participating in the consortium*
12 *under subsection (a) or at other research centers established*
13 *pursuant to this Act at the National Science Foundation,*
14 *the National Institute of Standards and Technology, the De-*
15 *partment of Energy, or the National Aeronautics and Space*
16 *Administration, for the purpose of supporting the activities*
17 *described in subsection (d).*

18 “(f) *INDUSTRY COORDINATION.—The Hub shall col-*
19 *laborate with the Quantum Consortium established in sec-*
20 *tion 201(b) or other industry consortia to identify, publish,*
21 *facilitate, or enable quantum-related education and work-*
22 *force development opportunities as described in subsections*
23 *(c) and (d).*

24 “(g) *APPLICATION.—A consortium seeking funding*
25 *under this section shall submit to the Director of the Na-*

1 *tional Science Foundation an application at such time, in*
2 *such manner, and containing such information as the Di-*
3 *rector may require. Each application shall include a de-*
4 *scription of how the consortium shall carry out the fol-*
5 *lowing:*

6 “(1) *Contribute to the success of the Hub and*
7 *fulfill the purposes of the Hub.*

8 “(2) *Include industry participation in fulfilling*
9 *the purposes of the Hub.*

10 “(3) *Collaborate with other members of the con-*
11 *sortium to share expertise in integrating quantum in-*
12 *formation science, engineering, and technology into*
13 *existing STEM programs and other relevant fields*
14 *and disciplines.*

15 “(4) *Support long-term and short-term workforce*
16 *development in the quantum field.*

17 “(5) *Develop and implement outreach activities*
18 *to increase the participation of women and other stu-*
19 *dents from groups historically underrepresented in*
20 *STEM.*

21 “(h) *SELECTION AND DURATION.—*

22 “(1) *IN GENERAL.—The Hub established under*
23 *this section is authorized to carry out activities for a*
24 *period of 5 years.*

1 “(2) *REAPPLICATION*.—An awardee may reapply
2 for an additional, subsequent period of 5 years fol-
3 lowing a successful, merit-based review.

4 “(3) *TERMINATION*.—Consistent with the au-
5 thorities of the National Science Foundation, the Di-
6 rector of the National Science Foundation may termi-
7 nate the Hub if it is underperforming during the per-
8 formance period.

9 “(i) *COORDINATION*.—The Hub shall coordinate with
10 other research centers established under this Act at the Na-
11 tional Science Foundation, the National Institute of Stand-
12 ards and Technology, the Department of Energy, the Na-
13 tional Aeronautics and Space Administration, and other
14 relevant Federal agencies, as appropriate, on activities and
15 resources.

16 “(j) *FUNDING*.—The Director of the National Science
17 Foundation shall allocate up to \$10,000,000 for the Hub
18 for each of fiscal years 2024 through 2028, subject to the
19 availability of appropriations. Amounts made available to
20 carry out this section shall be derived from amounts appro-
21 priated or otherwise made available to the National Science
22 Foundation.

23 **“SEC. 304. QUANTUM TESTBEDS.**

24 “(a) *IN GENERAL*.—Not later than one year after the
25 date of the enactment of this Act, the Director of the Na-

1 *tional Science Foundation, in coordination with the Direc-*
2 *tor of the National Institute of Standards and Technology,*
3 *the Secretary of Energy, and the heads of other Federal*
4 *agencies, as determined appropriate by the Director of the*
5 *National Science Foundation, shall make awards on a com-*
6 *petitive, merit-reviewed basis to institutions of higher edu-*
7 *cation, nonprofit organizations, Federally Funded Research*
8 *and Development Centers, or consortia thereof, to establish*
9 *not more than five testbeds for quantum applications re-*
10 *search and development.*

11 “(b) *PURPOSES.*—*The quantum testbeds established*
12 *under subsection (a) shall focus on advancing research and*
13 *development for near-term and medium-term quantum ap-*
14 *plication use cases by providing accessible research re-*
15 *sources to academia and industry for developing and testing*
16 *such use cases, including through proof-of-concept testing,*
17 *demonstrations, pilot projects, and prototyping.*

18 “(c) *APPLICATION PROPOSALS.*—*An applicant for an*
19 *award under this section shall submit to the Director a pro-*
20 *posal at such time, in such manner, and containing such*
21 *information as the Director may reasonably require. The*
22 *proposal shall, at a minimum, describe the following:*

23 “(1) *How the applicant will assemble a work-*
24 *force, including from populations that are historically*

1 *underrepresented in STEM, with the skills needed to*
2 *operate a quantum testbed.*

3 *“(2) How the applicant will ensure broad access*
4 *to a quantum testbed, including for start-ups and*
5 *small businesses.*

6 *“(3) How a quantum testbed will operate after*
7 *Federal funding has ended.*

8 *“(d) PRIORITIZATION.—The Director of the National*
9 *Science Foundation shall prioritize the following:*

10 *“(1) Applicants that ensure not less than 25 per-*
11 *cent of the cost for a testbed awarded under this sec-*
12 *tion is provided by private or non-Federal entities,*
13 *including in-kind contributions.*

14 *“(2) Awards for consortia that include quantum*
15 *industry participation.*

16 *“(e) ROLES AND RESPONSIBILITIES.—The Director of*
17 *the National Science Foundation shall be responsible for the*
18 *following:*

19 *“(1) Maintaining a record of notable outcomes*
20 *from each quantum testbed established under this sec-*
21 *tion.*

22 *“(2) Partnering with other Federal agencies to*
23 *enable opportunities for quantum testbed outcomes to*
24 *be appropriately taken up by such agencies in align-*
25 *ment with the missions of such agencies.*

1 “(3) Not later than one year after the date of the
2 enactment of this section and every two years there-
3 after until December 31, 2030, briefing the appro-
4 priate committees of Congress on the status of such
5 quantum testbeds and providing recommendations for
6 improving such quantum testbeds.

7 “(f) COORDINATION.—In establishing quantum
8 testbeds under this section, the Director of the National
9 Science Foundation shall ensure coordination with other
10 testbeds and other quantum facilities hosting Federal quan-
11 tum technology and infrastructure supported by the Na-
12 tional Science Foundation, including those authorized pur-
13 suant to section 10390 of the Research and Development,
14 Competition, and Innovation Act (Public Law 117–167; 42
15 U.S.C. 10990), or by other Federal agencies as determined
16 appropriate by the Director, to avoid duplication and
17 maximize use of Federal resources.

18 “(g) STAKEHOLDER COLLABORATION.—In carrying
19 out this section, the Director of the National Science Foun-
20 dation shall collaborate with the Quantum Consortium es-
21 tablished pursuant to section 201(b) to accomplish the pur-
22 poses of the quantum testbeds program described in sub-
23 section (b) and ensure there is strong collaboration with in-
24 dustry stakeholders. The Director may also engage with Na-
25 tional Laboratories, federally funded research and develop-

1 *ment centers, industry, and other members of the United*
2 *States quantum ecosystem.*

3 “(h) *GEOGRAPHIC DIVERSITY.*—*The Director shall en-*
4 *sure regional and geographic diversity in issuing awards*
5 *under this section.*

6 “(i) *FUNDING.*—*The Director of the National Science*
7 *Foundation shall allocate up to \$50,000,000 for the quan-*
8 *tum testbeds under this section for each fiscal years 2024*
9 *through 2028, subject to the availability of appropriations.*
10 *Amounts made available to carry out this section shall be*
11 *derived from amounts appropriated or otherwise made*
12 *available to the National Science Foundation.*

13 **“SEC. 305. RESEARCH SECURITY.**

14 *“The activities authorized under title III shall be ap-*
15 *plied in a manner consistent with subtitle D of title VI of*
16 *the Research and Development, Competition, and Innova-*
17 *tion Act (enacted as division B of Public Law 117–167;*
18 *42 U.S.C. 19231 et seq.).”.*

19 **SEC. 16. DEPARTMENT OF ENERGY QUANTUM INFORMA-**
20 **TION SCIENCE RESEARCH PROGRAM.**

21 *Section 401 of the National Quantum Initiative Act*
22 *(15 U.S.C. 8851) is amended—*

23 (1) *by amending subsection (a) to read as fol-*
24 *lows:*

1 “(a) *IN GENERAL.—The Secretary of Energy shall*
2 *carry out a research, development, and demonstration pro-*
3 *gram on quantum information science, engineering, and*
4 *technology.*”;

5 (2) *in subsection (b)—*

6 (A) *in paragraph (1), by inserting “, engi-*
7 *neering, and technology” after “science”;*

8 (B) *by redesignating paragraphs (3), (4),*
9 *and (5) as paragraphs (5), (6), and (7), respec-*
10 *tively;*

11 (C) *by inserting after paragraph (2) the fol-*
12 *lowing new paragraphs:*

13 “(3) *operate National Quantum Information*
14 *Science Research Centers to accelerate and scale up*
15 *scientific and technical breakthroughs in quantum in-*
16 *formation science, engineering, and technology, and*
17 *maintain state-of-the-art infrastructure for quantum*
18 *researchers and industry partners, in accordance with*
19 *section 402;*

20 “(4) *conduct cooperative research with industry,*
21 *National Laboratories, institutions of higher edu-*
22 *cation, and other research institutions to facilitate the*
23 *development and demonstration of quantum informa-*
24 *tion science, engineering, and technology, including*
25 *in the fields of—*

1 “(A) quantum information theory;

2 “(B) quantum physics;

3 “(C) quantum computational science, in-
4 cluding hardware and software, including artifi-
5 cial intelligence, machine learning and data
6 science;

7 “(D) quantum data storage, including
8 hardware and software for energy efficient data
9 centers;

10 “(E) applied mathematics and algorithm
11 development;

12 “(F) quantum communications and net-
13 working, including hardware and software for
14 quantum communications and networking;

15 “(G) quantum sensing and detection;

16 “(H) materials science and engineering;

17 “(I) quantum modeling and simulation, in-
18 cluding molecular modeling;

19 “(J) near- and long-term application devel-
20 opment in a range of areas as determined by the
21 Secretary, such as materials discovery, advanced
22 manufacturing, cybersecurity, energy efficiency
23 and energy technologies, energy storage and elec-
24 tric grid management;

25 “(K) quantum chemistry;

1 “(L) quantum biology;
2 “(M) superconductive and high-performance
3 microelectronics; and
4 “(N) quantum security technologies;”;
5 (D) by amending paragraph (5), as so re-
6 designated, to read as follows:
7 “(5) provide research experiences and training
8 for additional undergraduate and graduate students
9 in quantum information science, engineering, and
10 technology, including in the fields specified in para-
11 graph (4);”;
12 (E) in paragraph (6), as so redesignated—
13 (i) in subparagraph (E), by striking
14 “and” after the semicolon;
15 (ii) by redesignating subparagraph (F)
16 as subparagraph (J); and
17 (iii) by inserting after subparagraph
18 (E) the following new subparagraphs:
19 “(F) the Office of Electricity;
20 “(G) the Office of Cybersecurity, Energy Se-
21 curity, and Emergency Response;
22 “(H) the Office of Fossil Energy and Car-
23 bon Management;
24 “(I) the Office of Technology Transitions;
25 and”;

1 (F) in paragraph (7), as so redesignated, by
2 striking the period and inserting “and other rel-
3 evant efforts as defined by the Secretary of En-
4 ergy; and”; and

5 (G) by adding at the end the following new
6 paragraph:

7 “(8) leverage the collective body of knowledge and
8 data, including experience and resources from exist-
9 ing Federal research activities and commercially-
10 available quantum computing hardware and software
11 to the extent practicable.”; and

12 (3) by adding at the end the following:

13 “(c) *QUANTUM HIGH PERFORMANCE COMPUTING*
14 *STRATEGIC PLAN.*—Not later than one year after the date
15 of the enactment of this subsection, the Secretary of Energy
16 shall submit to Congress a report containing a 10-year stra-
17 tegic plan to guide Federal programs in designing, expand-
18 ing, commercializing, and procuring hybrid, high perform-
19 ance computing systems featuring the ability to integrate
20 a diverse set of resources, including artificial intelligence
21 and machine learning, accelerated by quantum supercom-
22 puters to enable the Department of Energy’s computing fa-
23 cilities to continuously advance computing resources. Such
24 strategic plan shall include the following:

1 “(1) *A conceptual plan to leverage capabilities*
2 *and infrastructure from the exascale computing pro-*
3 *gram, as the Secretary of Energy determines nec-*
4 *essary.*

5 “(2) *A plan to minimize disruptions to the ad-*
6 *vanced scientific computing workforce.*

7 “(3) *A consideration of a diversity of quantum*
8 *computing modalities.*

9 “(4) *A plan to integrate cloud access of commer-*
10 *cially available quantum hardware and software to*
11 *complement on-premises high performance computing*
12 *systems and resources consistent with the QUEST*
13 *program under section 404.*

14 “(5) *Implement the plan developed under this*
15 *section.*

16 “(d) *INDUSTRY OUTREACH.—In carrying out the pro-*
17 *gram under subsection (a) the Secretary of Energy shall*
18 *support the quantum technology industry and promote com-*
19 *mercialization of applications of quantum technology rel-*
20 *evant to the Department’s activities by carrying out the fol-*
21 *lowing:*

22 “(1) *Educating—*

23 “(A) *the energy industry on near term and*
24 *commercially available quantum technologies;*
25 *and*

1 “(B) the quantum industry on potential en-
2 ergy applications.

3 “(2) Accelerating the advancements of United
4 States quantum computing, communications, net-
5 working, sensing, and security capabilities to protect
6 and optimize the energy sector.

7 “(3) Advancing relevant domestic supply chains,
8 manufacturing capabilities, and associated simula-
9 tions or modeling capabilities.

10 “(4) Facilitating commercialization of quantum
11 technologies from National Laboratories and engaging
12 with the Quantum Consortium established pursuant
13 to section 201(b) and other organizations, as applica-
14 ble, to transition component technologies to help fa-
15 cilitate, as appropriate, the development of a quan-
16 tum supply chain.

17 “(5) Where appropriate, promoting participa-
18 tion by small and medium-sized businesses and
19 startups.

20 “(e) FUNDING.—Of the funds authorized to be appro-
21 priated for the Department of Energy’s Office of Science
22 pursuant to section 317 of the Department of Energy Re-
23 search and Innovation Act, there is authorized to be appro-
24 priated to the Secretary to carry out the activities under

1 *this section up to \$130,000,000 for each fiscal years 2024*
2 *through 2027.”.*

3 **SEC. 17. DOE QUANTUM INSTRUMENTATION AND FOUNDRY**
4 **PROGRAM.**

5 *Title IV of the National Quantum Initiative Act (15*
6 *U.S.C. 8851 et seq.) is amended by inserting after section*
7 *401 the following new section:*

8 **“SEC. 401A. DEPARTMENT OF ENERGY QUANTUM INSTRU-**
9 **MENTATION AND FOUNDRY PROGRAM.**

10 *“(a) IN GENERAL.—The Secretary of Energy shall es-*
11 *tablish a quantum instrumentation and infrastructure*
12 *foundry program to carry out the following:*

13 *“(1) Maintain United States leadership in quan-*
14 *tum information science, engineering, and technology.*

15 *“(2) Develop domestic quantum supply chains.*

16 *“(3) Provide resources for the broader scientific*
17 *community.*

18 *“(4) Support activities carried out under sec-*
19 *tions 401, 403, and 404.*

20 *“(b) PROGRAM COMPONENTS.—In carrying out the*
21 *program under subsection (a), the Secretary of Energy shall*
22 *design, build, develop, purchase, and commercialize special-*
23 *ized equipment, laboratory infrastructure, and state-of-the-*
24 *art instrumentation to advance quantum engineering re-*
25 *search and the development of quantum component tech-*

1 *nologies at a scale sufficient to meet the needs of the sci-*
 2 *entific community and enable commercialization of quan-*
 3 *tum technology.*

4 “(c) *QUANTUM FOUNDRIES.*—*In carrying out the pro-*
 5 *gram under subsection (a), and in coordination partnership*
 6 *with institutions of higher education and industry, the Sec-*
 7 *retary of Energy shall support the development of quantum*
 8 *foundries focused on meeting the device, hardware, software,*
 9 *and materials needs of the scientific community and the*
 10 *quantum supply chain.*

11 “(d) *FUNDING.*—*The Secretary of Energy shall allo-*
 12 *cate up to \$25,000,000 for each of fiscal years 2024 through*
 13 *2028 to carry out this section, subject to the availability*
 14 *of appropriations. Amounts made available to carry out*
 15 *this section shall be derived from amounts appropriated or*
 16 *otherwise made available to the Department of Energy’s Of-*
 17 *fice of Science.”.*

18 **SEC. 18. NATIONAL QUANTUM INFORMATION SCIENCE RE-**

19 **SEARCH CENTERS.**

20 *Section 402 of the National Quantum Initiative Act*
 21 *(15 U.S.C. 8852) is amended—*

22 *(1) in subsection (a)—*

23 *(A) in paragraph (1)—*

24 *(i) by striking “basic”;*

1 (ii) by striking “science and tech-
2 nology” and inserting “science, engineering,
3 and technology, expand capacity for the do-
4 mestic quantum workforce,”; and

5 (iii) by striking “section 401” and in-
6 serting “sections 401, 403, and 404”; and

7 (B) in paragraph (2)(C), by inserting “that
8 may include one or more commercial entities”
9 after “collaborations”;

10 (2) in subsection (b), by inserting “, and should
11 be inclusive of the variety of viable quantum tech-
12 nologies, where appropriate” before the period;

13 (3) in subsection (c),

14 (A) by striking “basic”; and

15 (B) by inserting “, engineering, and tech-
16 nology, accelerating quantum workforce develop-
17 ment,” after “science”;

18 (4) in subsection (d)(1)—

19 (A) in subparagraph (C), by striking “and”
20 after the semicolon;

21 (B) by redesignating subparagraph (D) as
22 subparagraph (E); and

23 (C) by inserting after subparagraph (C) the
24 following new subparagraph:

1 “(D) the Office of Technology Transitions;
2 and”;

3 (5) in subsection (e), by amending paragraph (2)
4 to read as follows:

5 “(2) RENEWAL.—Each Center under this section
6 may be renewed for an additional period of 5 years
7 following a successful, merit-based review and ap-
8 proval by the Director.”; and

9 (6) in subsection (f)—

10 (A) by striking “\$25,000,000” and inserting
11 “\$35,000,000”; and

12 (B) by striking “2019 through 2023” and
13 inserting “2024 through 2028”.

14 **SEC. 19. DEPARTMENT OF ENERGY QUANTUM NETWORK IN-**
15 **FRASTRUCTURE RESEARCH AND DEVELOP-**
16 **MENT PROGRAM.**

17 Section 403 of the National Quantum Initiative Act
18 (15 U.S.C. 8853) is amended—

19 (1) in subsection (a)—

20 (A) in paragraph (4)—

21 (i) by inserting “, including” after
22 “networking”; and

23 (ii) by striking “and” after the semi-
24 colon;

1 (B) in paragraph (5), by striking the period
2 and inserting a semicolon; and

3 (C) by adding at the end the following new
4 paragraphs:

5 “(6) where applicable, leverage a diversity of mo-
6 dalities and commercially-available quantum hard-
7 ware and software; and

8 “(7) develop education and training pathways
9 related to quantum network infrastructure invest-
10 ments, aligned with existing programmatic invest-
11 ments by the Department of Energy.”; and

12 (2) in subsection (b)—

13 (A) in paragraph (1)—

14 (i) by redesignating subparagraphs (C)
15 and (D) as subparagraphs (D) and (E), re-
16 spectively; and

17 (ii) by inserting after subparagraph
18 (B) the following new subparagraph:

19 “(C) the Administrator of the National Aer-
20 onautics and Space Administration;”;

21 (B) in paragraph (2)—

22 (i) in subparagraph (A), by inserting
23 “ground-to-space and” after “channels,”;

1 (ii) in subparagraph (E), by striking
2 “photon-based” and inserting “all applica-
3 ble modalities of”;

4 (iii) in subparagraph (F), by inserting
5 “, quantum sensors,” after “quantum re-
6 peaters”;

7 (iv) in subparagraph (G)—

8 (I) by inserting “data centers,”
9 after “repeaters,”; and

10 (II) by striking “and” after the
11 semicolon;

12 (v) in subparagraph (H)—

13 (I) by striking “the quantum tech-
14 nology stack” and inserting “quantum
15 technology modality stacks”; and

16 (II) by striking “National Lab-
17 oratories in” and inserting “National
18 Laboratories such as”; and

19 (vi) by adding at the end the following
20 new subparagraph:

21 “(I) development of quantum network and
22 entanglement distribution protocols or applica-
23 tions, including development of network stack
24 protocols and protocols enabling integration with
25 existing technologies or infrastructure; and

1 “(J) development of high efficiency room-
2 temperature photon detectors for quantum
3 photonics applications, including quantum net-
4 working and communications;”;

5 (C) in paragraph (4)—

6 (i) by striking “basic”; and

7 (ii) by striking “material” and insert-
8 ing “materials”; and

9 (D) in paragraph (5), by striking “funda-
10 mental”;

11 (3) in subsection (c)(6), by inserting “, including
12 small and medium-sized businesses and startups” be-
13 fore the semicolon; and

14 (4) in subsection (d), by striking “basic re-
15 search” and inserting “research, development, and
16 demonstration”.

17 **SEC. 20. DEPARTMENT OF ENERGY QUANTUM USER EXPAN-**
18 **SION FOR SCIENCE AND TECHNOLOGY PRO-**
19 **GRAM.**

20 Section 404 of the of the National Quantum Initiative
21 Act (15 U.S.C. 8854) is amended—

22 (1) in subsection (a)—

23 (A) in the matter preceding paragraph (1),
24 by striking “and quantum computing clouds”

1 *and inserting “, software, and cloud-based quan-*
2 *tum computers”;*

3 *(B) in paragraph (3), by striking “and”*
4 *after the semicolon;*

5 *(C) in paragraph (4), by striking the period*
6 *and inserting a semicolon; and*

7 *(D) by adding at the end the following new*
8 *paragraphs:*

9 *“(5) to enable development of software and ap-*
10 *plications, including estimation of resources needed to*
11 *scale applications; and*

12 *“(6) to develop near-term quantum applications*
13 *to solve public and private sector problems.”;*

14 *(2) in subsection (b)—*

15 *(A) in paragraph (4), by striking “and”*
16 *after the semicolon;*

17 *(B) in paragraph (5), by striking the period*
18 *and inserting a semicolon; and*

19 *(C) by at the end the following new para-*
20 *graphs:*

21 *“(6) enables users to develop algorithms, software*
22 *tools, simulators, and applications for quantum sys-*
23 *tems using cloud-based quantum computers; and*

1 “(7) partner with appropriate public and pri-
2 vate sector entities to develop training and education
3 opportunities on prototype and early-state devices.”;

4 (3) in subsection (c)—

5 (A) by redesignating paragraphs (4), (5),
6 (6), (7), and (8) as paragraphs (5), (6), (7), (8),
7 and (9), respectively;

8 (B) by inserting after paragraph (3) the fol-
9 lowing new paragraph:

10 “(4) the National Oceanic and Atmospheric Ad-
11 ministration;”; and

12 (C) in paragraph (7), as so redesignated, by
13 inserting “, including small and medium-sized
14 businesses and startups” before the semicolon;
15 and

16 (4) in subsection (e)—

17 (A) in paragraph (4), by striking “and”
18 after the semicolon;

19 (B) in paragraph (5), by striking the period
20 and inserting “; and”; and

21 (C) by adding at the end the following new
22 paragraph:

23 “(6) \$38,000,000 for fiscal year 2028.”.

1 **SEC. 21. QUANTUM INFORMATION SCIENCE TO ENHANCE**
2 **THE RESILIENCE, SECURITY, AND EFFI-**
3 **CIENCY OF THE ELECTRIC GRID.**

4 (a) *IN GENERAL.*—Title IV of the National Quantum
5 Initiative Act (15 U.S.C. 8851 et seq.) is amended by add-
6 ing at the end the following:

7 **“SEC. 405. QUANTUM INFORMATION SCIENCE TO ENHANCE**
8 **THE RESILIENCE AND SECURITY OF THE**
9 **ELECTRIC GRID.**

10 “(a) *IN GENERAL.*—The Secretary of Energy (referred
11 to in this section as the ‘Secretary’) shall conduct research,
12 development, and demonstration activities focused on the
13 use of quantum information science, engineering, and tech-
14 nology, including through quantum applications and quan-
15 tum computing, to enhance the resilience, security, and effi-
16 ciency of the electric grid in the United States.

17 “(b) *RESEARCH AREAS.*—In carrying out subsection
18 (a), the Secretary may conduct research in the following
19 areas:

20 “(1) *Fault detection and prediction.*

21 “(2) *Grid security and safety, including through*
22 *post-quantum cryptography.*

23 “(3) *Integrated grid planning.*

24 “(4) *Grid optimization.*

25 “(5) *Enhanced modeling.*

26 “(6) *Energy storage.*

1 “(7) *Energy market optimization.*

2 “(8) *Any other area in which, in the determina-*
3 *tion of the Secretary, quantum information science,*
4 *engineering, and technology can enhance the resil-*
5 *ience, security, and efficiency of the electric grid in*
6 *the United States.*

7 “(c) *COOPERATION.—To the extent practicable, the*
8 *Secretary shall conduct research, development, and dem-*
9 *onstration activities under subsection (a) in cooperation,*
10 *including through partnerships, as the Secretary determines*
11 *to be appropriate, with members of relevant industries, Na-*
12 *tional Laboratories, institutions of higher education, and*
13 *other relevant institutions, including research institutions,*
14 *as determined by the Secretary.”.*

15 “(b) *CLERICAL AMENDMENT.—The table of contents in*
16 *section 1(b) of the National Quantum Initiative Act (Public*
17 *Law 115–368; 132 Stat. 5092; 136 Stat. 1441) is amended*
18 *by inserting after the item relating to section 404 the fol-*
19 *lowing:*

 “Sec. 405. *Quantum information science to enhance the resilience and security of*
 the electric grid.

 “Sec. 406. *Research security.”.*

20 **SEC. 22. RESEARCH SECURITY.**

21 *Title IV of the National Quantum Initiative Act (15*
22 *U.S.C. 8851 et seq.) is amended by adding at the end the*
23 *following new section:*

1 **“SEC. 406. RESEARCH SECURITY.**

2 *“The activities authorized under title IV shall be ap-*
 3 *plied in a manner consistent with subtitle D of title VI of*
 4 *the Research and Development, Competition, and Innova-*
 5 *tion Act (enacted as division B of Public Law 117–167;*
 6 *42 U.S.C. 19231 et seq.).”.*

7 **SEC. 23. NATIONAL AERONAUTICS AND SPACE ADMINISTRA-**
 8 **TION QUANTUM ACTIVITIES.**

9 *The National Quantum Initiative Act is amended by*
 10 *adding at the end the following new title:*

11 **“TITLE V—NATIONAL AERO-**
 12 **NAUTICS AND SPACE ADMIN-**
 13 **ISTRATION QUANTUM ACTIVI-**
 14 **TIES**

15 **“SEC. 501. QUANTUM INFORMATION SCIENCE, ENGINEER-**
 16 **ING, AND TECHNOLOGY RESEARCH FOR**
 17 **SPACE AND AERONAUTICS.**

18 *“(a) IN GENERAL.—The Administrator of the National*
 19 *Aeronautics and Space Administration is authorized to*
 20 *carry out research on quantum information science, engi-*
 21 *neering, and technology.*

22 *“(b) COOPERATION.—In carrying out subsection (a),*
 23 *the Administrator of the National Aeronautics and Space*
 24 *Administration—*

25 *“(1) shall consider cooperative arrangements*
 26 *with the Department of Energy and other Federal*

1 *Government agencies, as practicable, on areas of*
2 *shared benefit; and*

3 *“(2) may enter into memoranda of under-*
4 *standing or memoranda of agreement to establish*
5 *such cooperative arrangements.*

6 *“(c) STRATEGY.—Not later than 180 days after the*
7 *date of the enactment of this title, the Administrator of the*
8 *National Aeronautics and Space Administration shall sub-*
9 *mit to the appropriate committees of Congress a strategy*
10 *for National Aeronautics and Space Administration re-*
11 *search on quantum information science, engineering, and*
12 *technology. The strategy shall identify resources required to*
13 *support implementation of the strategy, including budgets,*
14 *workforce, and infrastructure, describe cooperative efforts*
15 *with other Federal Government agencies, and address areas*
16 *of research and applications, including the following:*

17 *“(1) Quantum sensing.*

18 *“(2) Quantum networking.*

19 *“(3) Quantum communications, including quan-*
20 *tum satellite communications.*

21 *“(4) Quantum computing.*

22 *“(5) Science, aeronautics, and exploration-re-*
23 *lated applications.*

1 “(6) *Any other area on quantum information,*
2 *science, engineering, and technology the Adminis-*
3 *trator determines necessary.*

4 “(d) *CONSULTATION.—In developing the strategy de-*
5 *scribed in subsection (c), the Administrator may seek input*
6 *from relevant external stakeholders, including institutions*
7 *of higher education, industry, and nonprofit research orga-*
8 *nizations.*

9 “**SEC. 502. NATIONAL AERONAUTICS AND SPACE ADMINIS-**
10 **TRATION QUANTUM INSTITUTE.**

11 “(a) *IN GENERAL.—Subject to the availability of ap-*
12 *propriations, the Administrator of the National Aero-*
13 *navitics and Space Administration, in consultation with the*
14 *heads of other Federal departments and agencies, as appro-*
15 *priate, may carry out a program to establish an institute*
16 *focused on space and aeronautics applications of quantum*
17 *information science, engineering, and technology.*

18 “(b) *INSTITUTE DETAILS.—*

19 “(1) *COMPETITIVE, MERIT-REVIEWED PROC-*
20 *ESS.—The institute under this section shall be estab-*
21 *lished through a competitive, merit-reviewed process.*

22 “(2) *APPLICATIONS.—An eligible applicant*
23 *under this section shall submit to the Administrator*
24 *of the National Aeronautics and Space Administra-*
25 *tion an application at such time, in such manner,*

1 *and containing such information as the Adminis-*
2 *trator determines to be appropriate.*

3 “(3) *ELIGIBLE APPLICANTS.*—*When admin-*
4 *istering the process described in paragraph (1), the*
5 *Administrator of the National Aeronautics and Space*
6 *Administration shall consider applications from in-*
7 *stitutions of higher education, research centers, multi-*
8 *institutional collaborations, and any other entity that*
9 *the Administrator determines to be appropriate.*

10 “(4) *COLLABORATIONS.*—*A collaboration that re-*
11 *ceives an award under this section may include mul-*
12 *tiple types of research institutions, private sector enti-*
13 *ties, and nonprofit organizations.*

14 “(5) *COORDINATION.*—*The Administrator of the*
15 *National Aeronautics and Space Administration shall*
16 *ensure an awardee under this section coordinates the*
17 *activities carried out under this section with the Na-*
18 *tional Aeronautics and Space Administration, and*
19 *avoids unnecessary duplication of the existing activi-*
20 *ties of the National Aeronautics and Space Adminis-*
21 *tration, other activities carried out under this Act,*
22 *and other related programs, as appropriate.*

23 “(6) *COMMERCIAL TECHNOLOGY.*—*The institute*
24 *under this section may leverage commercially-avail-*

1 *able hardware and software to carry out the activities*
2 *described in subsection (c).*

3 “(c) *INSTITUTE ACTIVITIES.—The institute under this*
4 *section may carry out activities that—*

5 “(1) *support research focused on developing*
6 *space and aeronautics applications for quantum in-*
7 *formation science, engineering, and technology, in-*
8 *cluding as related to the results of the strategy under*
9 *section 501(c); and*

10 “(2) *support quantum information science, engi-*
11 *neering, and technology education and public out-*
12 *reach.*

13 “(d) *INSTITUTE REQUIREMENTS.—To the maximum*
14 *extent practicable, the institute under this section shall*
15 *serve the needs of the National Aeronautics and Space Ad-*
16 *ministration for the benefit of the broader United States*
17 *quantum information science community, to create and de-*
18 *velop processes for the purpose of advancing space and aero-*
19 *nautics applications in quantum information science, engi-*
20 *neering, and technology, and improving the competitiveness*
21 *of the United States.*

22 “(e) *INSTITUTE SELECTION AND DURATION.—*

23 “(1) *IN GENERAL.—Subject to the availability of*
24 *appropriations, the institute under this section may*
25 *carry out activities for a period of 5 years.*

1 “(2) *REAPPLICATION.*—Subject to the avail-
2 ability of appropriations, an awardee may reapply
3 for an additional, subsequent period of 5 years fol-
4 lowing a successful, merit-based review.

5 “(3) *TERMINATION.*—Consistent with the au-
6 thorities of the National Aeronautics and Space Ad-
7 ministration, the Administrator of the National Aero-
8 nautics and Space Administration may terminate the
9 institute for cause during the performance period.

10 **“SEC. 503. AUTHORIZATION OF APPROPRIATIONS.**

11 *“The Administrator of the National Aeronautics and*
12 *Space Administration shall allocate up to \$25,000,000 to*
13 *carry out the activities authorized in sections 501 and 502*
14 *for each of fiscal years 2024 through 2028, subject to the*
15 *availability of appropriations. Amounts made available to*
16 *carry out sections 501 and 502 shall be derived from*
17 *amounts appropriated or otherwise made available to the*
18 *National Aeronautics and Space Administration.*

19 **“SEC. 504. RESEARCH SECURITY.**

20 *“The activities authorized under title V shall be ap-*
21 *plied in a manner consistent with subtitle D of title VI of*
22 *the Research and Development, Competition, and Innova-*
23 *tion Act (enacted as division B of Public Law 117–167;*
24 *42 U.S.C. 19231 et seq.).”*

1 **SEC. 24. NATIONAL SCIENCE FOUNDATION CRYPTOGRAPHY**
 2 **RESEARCH.**

3 *Subsection (a)(1)(A) of section 4 of the Cyber Security*
 4 *Research and Development Act (15 U.S.C. 7403) is amend-*
 5 *ed by inserting “, including post-quantum cryptography (as*
 6 *such term is defined in section 3 of the Quantum Com-*
 7 *puting Cybersecurity Preparedness Act (6 U.S.C. 1526 note;*
 8 *Public Law 117–260))” before the semicolon.*

9 **SEC. 25. CLERICAL AMENDMENTS.**

10 *The table of contents in section 1(b) of the National*
 11 *Quantum Initiative Act is amended as follows:*

12 *(1) By inserting after the item relating to section*
 13 *105 the following new item:*

“Sec. 105A. International Quantum Cooperation Strategy.”.

14 *(2) By inserting after the item relating to section*
 15 *201 the following new items:*

“Sec. 202. National Institute of Standards and Technology Quantum Centers.”;

16 *(3) By inserting after the item relating to section*
 17 *302 the following new items:*

“Sec. 303. Quantum Reskilling, Education, and Workforce (QREW) Coordination
Hub.

“Sec. 304. Quantum testbeds.”.

18 *(4) By inserting after the item relating to section*
 19 *401 the following new item:*

“Sec. 401A. Department of Energy Quantum Instrumentation and Foundry Pro-
gram.”.

20 *(5) By adding at the end the following new*
 21 *items:*

*“TITLE V—NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
QUANTUM ACTIVITIES*

*“Sec. 501. Quantum information science, engineering, and technology research for
space and aeronautics.*

“Sec. 502. National Aeronautics and Space Administration quantum institute.

“Sec. 503. Authorization of appropriations.

“Sec. 504. Research security.”.

Union Calendar No. 510

118TH CONGRESS
2^D SESSION

H. R. 6213

[Report No. 118-612]

A BILL

To reauthorize the National Quantum Initiative
Act, and for other purposes.

JULY 25, 2024

Reported with an amendment, committed to the Committee of the Whole House on the State of the Union, and ordered to be printed