A motion to reconsider was laid on the table.

NATIONAL QUANTUM INITIATIVE ACT

Mr. SMITH of Texas. Madam Speaker, I move to suspend the rules and pass the bill (H.R. 6227) to provide for a coordinated Federal program to accelerate quantum research and development for the economic and national security of the United States, as amended.

The Clerk read the title of the bill.

The text of the bill is as follows:

H.R. 6227

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE; TABLE OF CONTENTS.

(a) SHORT TITLE.—This Act may be cited as the ''National Quantum Initiative Act''.

(b) TABLE OF CONTENTS.—

SEC. 2. DEFINITIONS.

In this Act, the following definitions apply:

(1) ADVISORY COMMITTEE.—The term ''Advisory Committee'' means the National Quantum Initiative Advisory Committee established under section 104(a).

(2) COORDINATION OFFICE.—The term ''Coordination Office'' means the National Quantum Coordination Office established under section 102(a).

(3) INSTITUTIONS OF HIGHER EDUCATION.—The term ''institutions of higher education'' has the meaning given the term in section 101(a) of the Higher Education Act of 1965 (20 U.S.C. 1001(a)).

(4) PROGRAM.—The term ''Program'' means the National Quantum Initiative Program implemented under section 101(a).

(5) QUANTUM INFORMATION SCIENCE.—The term ''quantum information science'' means the storage, transmission, manipulation, or measurement of information that is encoded in systems that can only be described by the laws of quantum physics.

(6) SUBCOMMITTEE.—The term ''Subcommittee'' means the Subcommittee on Quantum Information Science of the National Science and Technology Council established under section 103(a).

SEC. 3. PURPOSES.

The purposes of this Act are to ensure the continued leadership of the United States in quantum information science and its technology applications by—

(1) supporting research, development, demonstration, and application of quantum information science and technology in order to—

(A) expand the number of researchers, educators, and students with training in quantum information science and technology to develop a workforce pipeline;

(B) promote the development and inclusion of multidisciplinary curriculum and research opportunities for quantum information science at the undergraduate, graduate, and postdoctoral level;

(C) address basic research knowledge gaps;

(D) promote the further development of facilities and centers available for quantum information science and technology research, testing and education; and

(E) stimulate research on and promote more rapid development of quantum-based technologies;

(2) improving the interagency planning and coordination of Federal research and development of quantum information science and technology and maximizing the effectiveness of the Federal Government's quantum information science and technology research and development programs;

(3) promoting collaboration among government, Federal laboratories, industry, and universities; and

(4) promoting the development of standards for quantum information science and technology security.

TITLE I—NATIONAL QUANTUM INITIATIVE

SEC. 101. NATIONAL QUANTUM INITIATIVE PROGRAM.

The President shall implement a 10-year National Quantum Initiative Program. In carrying out the Program, the President shall, acting through appropriate Federal agencies, councils, working groups, subcommittees, and the Coordination Office—

(1) establish the goals, priorities, and metrics for a 10-year plan to accelerate development of quantum information science and technology applications in the United States;

(2) invest in fundamental Federal quantum information science and technology research, development, demonstration, and other activities to achieve the goals established in paragraph (1);

(3) invest in activities to develop a quantum information science and technology workforce pipeline;

(4) provide for interagency coordination of Federal quantum information science and technology research, development, demonstration, and other activities undertaken pursuant to the Program;

(5) partner with industry and academia to leverage knowledge and resources; and

(6) leverage existing Federal investments efficiently to advance Program goals and objectives.

SEC. 102. NATIONAL QUANTUM COORDINATION OFFICE.

(a) ESTABLISHMENT.—The President shall establish a National Quantum Coordination Office, which shall have—

(1) a Director appointed by the Director of the Office of Science and Technology Policy, in consultation with the Secretary of Commerce, the Director of the National Science Foundation, and the Secretary of Energy; and

(2) staff that shall be comprised of employees detailed from the Federal agencies that are members of the Subcommittee.

(b) RESPONSIBILITIES.—The Coordination Office shall—

(1) provide technical and administrative support to—

(A) the Subcommittee; and

(B) the Advisory Committee;

(2) oversee interagency coordination of the Program, including encouraging and supporting joint agency solicitation and selection of applications for funding of projects under the Program;

(3) serve as the point of contact on Federal civilian quantum information science and technology activities for Government organizations, academia, industry, professional societies, State governments, and others to exchange technical and programmatic information;

(4) ensure coordination between the Multidisciplinary Centers for Quantum Research and Education established under section 302(a) and the National Quantum Information Science Research Centers established under section 402(a);

(5) conduct public outreach, including dissemination of findings and recommendations of the Advisory Committee, as appropriate;

(6) promote access to and early application of the technologies, innovations, and expertise derived from Program activities to agency missions and systems across the Federal Government, and to United States industry, including startup companies; and

(7) promote access, through appropriate Government agencies, to existing quantum computing and communication systems developed by industry, academia, and Federal laboratories to the general user community in pursuit of discovery of the new applications of such systems.

(c) FUNDING.—Funds necessary to carry out the activities of the Coordination Office shall be made available each fiscal year by the participating agencies of the Subcommittee, as determined by the Director of the Office of Science and Technology Policy.

SEC. 103. SUBCOMMITTEE ON QUANTUM INFORMATION SCIENCE.

(a) ESTABLISHMENT.—The President shall establish, through the National Science and Technology Council, a Subcommittee on Quantum Information Science.

(b) MEMBERSHIP.—The Subcommittee shall include—

(1) the National Institute of Standards and Technology;

(2) the National Science Foundation;

(3) the Department of Energy;

(4) the National Aeronautics and Space Administration;

(5) the Department of Defense;

(6) the Office of the Director of National Intelligence;

(7) the Office of Management and Budget;

(8) the Office of Science and Technology Policy; and

(9) any other Federal agency as considered appropriate by the President.

(c) CHAIRS.—The Subcommittee shall be jointly chaired by the Director of the National Institute of Standards and Technology, the Director of the National Science Foundation, and the Secretary of Energy.

(d) RESPONSIBILITIES.—The Subcommittee shall—

(1) coordinate the quantum information science and technology research and education activities and programs of the Federal agencies;

(2) establish goals and priorities of the Program, based on identified knowledge and workforce gaps and other national needs;

(3) assess and recommend Federal infrastructure needs to support the Program; and

(4) evaluate opportunities for international cooperation with strategic allies on research and development in quantum information science and technology.

(e) STRATEGIC PLAN.—Not later than 1 year after the date of enactment of this Act, the Subcommittee shall develop a 5-year strategic plan, and 6 years after enactment of the Act develop an additional 5-year strategic plan, with periodic updates as appropriate to guide the activities of the Program, meet the goals, priorities,

and anticipated outcomes of the participating agencies.

(f) REPORTS.—The Chairs of the Subcommittee shall submit to the President, the Advisory Committee, the Committee on Science, Space, and Technology of the House of Representatives, the Committee on Commerce, Science, and Transportation and the Committee on Energy and Natural Resources of the Senate, and other appropriate committees of Congress the strategic plans developed under subsection (e) and any updates to such plans.

SEC. 104. NATIONAL QUANTUM INITIATIVE ADVISORY COMMITTEE.

(a) IN GENERAL.—The President shall establish a National Quantum Initiative Advisory Committee.

(b) QUALIFICATIONS.—The Advisory Committee established by the President under subsection (a) shall consist of members from industry, academic institutions, and Federal laboratories. The President shall appoint members to the Advisory Committee who are qualified to provide advice and information on quantum information science and technology research, development, demonstrations, education, technology transfer, commercial application, or national security and economic concerns.

(c) MEMBERSHIP CONSIDERATION.—In selecting an Advisory Committee, the President may seek and give consideration to recommendations from the Congress, industry, the scientific community (including the National Academy of Sciences, scientific professional societies, and academia), the defense community, and other appropriate organizations.

(d) DUTIES.—The Advisory Committee shall advise the President and the Subcommittee and make recommendations that shall be considered in reviewing and revising the Program. The Advisory Committee shall provide the President and the Subcommittee with an independent assessment of—

(1) trends and developments in quantum information science and technology;

(2) progress made in implementing the Program;

(3) whether the Program activities, priorities, and technical goals developed by the Subcommittee are helping to maintain United States leadership in quantum information science and technology;

(4) the management, coordination, implementation, and activities of the Program;

(5) the need to revise the Program;

(6) whether or not there are opportunities for international cooperation with strategic allies on research and development in quantum information science and technology; and

(7) whether national security, societal, economic, legal, and workforce concerns are adequately addressed by the Program.

(e) REPORTS.—The Advisory Committee shall report, not less frequently than once every 2 years, to the President on the assessments required under subsection (d) and any recommendations to improve the Program. The first report under this subsection shall be submitted not later than 6 months after the date of enactment of this Act. The Director of the Office of Science and Technology Policy shall transmit a copy of each report under this subsection to the Committee on Science, Space, and Technology of the House of Representatives, the Committee on Commerce, Science, and Technology of the Senate, the Committee on Energy and Natural Resources of the Senate, and other appropriate committees of the Congress.

(f) TRAVEL EXPENSES OF NON-FEDERAL MEMBERS.—Non-Federal members of the Advisory Committee, while attending meetings of the Advisory Committee or while otherwise serving at the request of the head of the Advisory Committee away from their homes or regular places of business, may be allowed travel expenses, including per diem in lieu of subsistence, as authorized by section 5703 of title 5, United States Code, for individuals in the Government serving without pay. Nothing in this subsection shall be construed to prohibit members of the Advisory Committee who are officers or employees of the United States from being allowed travel expenses, including per diem in lieu of subsistence, in accordance with existing law.

(g) EXEMPTION.—The Advisory Committee shall be exempt from section 14 of the Federal Advisory Committee Act (5 U.S.C. App.).

SEC. 105. SUNSET.

(a) IN GENERAL.—Except as provided for in subsection (b), the authority to carry out sections 101, 102, 103, and 104 shall terminate on the date that is 11 years after the date of enactment of this Act.

(b) EXTENSION.—The President may continue the activities under such sections if the President determines that such activities are necessary to meet national economic or national security needs.

TITLE II—NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY QUANTUM ACTIVITIES

SEC. 201. NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY ACTIVITIES AND QUANTUM WORKSHOP.

(a) NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY ACTIVITIES.—As part of the Program described in title I, the Director of the National Institute of Standards and Technology shall—

(1) continue to support and expand basic quantum information science and technology research and development of measurement and standards infrastructure necessary to advance commercial development of quantum applications;

(2) use its existing programs, in collaboration with other agencies, as appropriate, to train scientists in quantum information science and technology to increase participation in the quantum fields;

(3) establish or expand collaborative ventures or consortia with other public or private sector entities, including academia, National Laboratories, and industry for the purpose of advancing the field of quantum information science and engineering; and

(4) have the authority to enter into and perform such contracts, including cooperative research and development arrangements and grants and cooperative agreements or other transactions, as may be necessary in the conduct of the work of the Institute and on such terms as the Director considers appropriate, in furtherance of the purposes of this Act.

(b) QUANTUM WORKSHOP.—

(1) IN GENERAL.—Not later than 1 year after the date of enactment of this Act, the Director of the National Institute of Standards and Technology shall convene a workshop of stakeholders to discuss the future measurement, standards, cybersecurity, and other appropriate needs for supporting the development of a robust quantum information science and technology industry in the United States. The goals of the workshop shall be to—

(A) assess the current research on the issues described in this paragraph;

(B) evaluate the research gaps relating to such issues; and

(C) provide recommendations on how the National Institute of Standards and Technology and the Program can address the research needs identified.

(2) REPORT TO CONGRESS.—Not later than 2 years after the date of enactment of this Act, the Director of the National Institute of Standards and Technology shall transmit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a summary report containing the findings of the workshop convened under this section.

(c) FUNDING.—The Secretary of Commerce shall devote $400,000,000 to carry out this section, which shall include $80,000,000 for each of fiscal years 2019 through 2023, subject to the availability of appropriations, to come from amounts made available for the National Institute of Standards and Technology. This section shall be carried out using funds otherwise appropriated by law after the date of enactment of this Act.

TITLE III—NATIONAL SCIENCE FOUNDATION AND MULTIDISCIPLINARY CENTERS FOR QUANTUM RESEARCH AND EDUCATION

SEC. 301. QUANTUM INFORMATION SCIENCE RESEARCH AND EDUCATION PROGRAM.

(a) IN GENERAL.—The Director of the National Science Foundation shall carry out a basic research and education program on quantum information science and engineering.

(b) PROGRAM COMPONENTS.—In carrying out the program required under subsection (a), the Director of the National Science Foundation shall carry out activities that continue to support basic interdisciplinary quantum information science and engineering research, and support human resources development in all aspects of quantum information science and engineering. Such activities shall include—

(1) using the existing programs of the National Science Foundation, in collaboration with other Federal agencies, as appropriate, to—

(A) improve the teaching and learning of quantum information science and engineering at the undergraduate, graduate, and postgraduate levels; and

(B) increase participation in the quantum fields, including by individuals identified in sections 33 and 34 of the Science and Engineering Equal Opportunities Act (42 U.S.C. 1885a; 42 U.S.C. 1885b);

(2) formulating goals for quantum information science and engineering research and education activities to be supported by the National Science Foundation;

(3) leveraging the collective body of knowledge from existing quantum information science and engineering research and education activities;

(4) coordinating research efforts funded through existing programs across the directorates of the National Science Foundation; and

(5) engaging with other Federal agencies, research communities, and potential users of information produced under this section.

SEC. 302. MULTIDISCIPLINARY CENTERS FOR QUANTUM RESEARCH AND EDUCATION.

(a) MULTIDISCIPLINARY CENTERS FOR QUANTUM RESEARCH AND EDUCATION.—

(1) IN GENERAL.—The Director of the National Science Foundation, in consultation with other Federal agencies as appropriate, shall award grants to institutions of higher education or eligible nonprofit organizations (or consortia thereof) to establish up to 5 Multidisciplinary Centers for Quantum Research and Education.

(2) COLLABORATIONS.—A collaboration receiving an award under this subsection may include institutions of higher education, eligible nonprofit organizations, and private sector entities.

(3) PURPOSE.—The purpose of the Centers shall be to conduct basic research and education activities in support of the goals and priorities of the Program as determined in title I, to—

(A) continue to advance quantum information science and engineering;

(B) support curriculum and workforce development in quantum information science and engineering; and

(C) foster innovation by bringing industry perspectives to quantum research and workforce development, including by leveraging industry resources and research capacity.

(4) REQUIREMENTS.—An institution of higher education or an eligible nonprofit organization (or a consortium thereof) seeking funding under this section shall submit an application to the Director at such time, in such manner, and containing such information as the Director may

require. The application shall include, at a minimum, a description of—

(A) how the Center will work with other research institutions and industry partners to leverage expertise in quantum science, education and curriculum development, and technology transfer;

(B) how the Center will promote active collaboration among researchers in multiple disciplines involved in quantum research including physics, engineering, mathematics, computer science, chemistry, and material science;

(C) how the Center will support long-term and short-term workforce development in the quantum field;

(D) how the Center can support an innovation ecosystem to work with industry to translate Center research into applications; and

(E) a long-term plan to become self-sustaining after the expiration of Foundation support.

(5) SELECTION AND DURATION.—

(A) IN GENERAL.—The Centers selected and established under this section are authorized to carry out activities for a period of 5 years.

(B) REAPPLICATION.—An awardee may reapply for an additional, subsequent period of 5 years on a competitive, merit-reviewed basis.

(C) TERMINATION.—Consistent with the existing authorities of the Foundation, the Director of the National Science Foundation may terminate an underperforming Center for cause during the performance period.

(6) FUNDING.—The Director of the National Science Foundation shall devote $250,000,000 to carry out this section, which shall include $50,000,000 for each of fiscal years 2019 through 2023, subject to the availability of appropriations, to come from amounts made available for Research and Related Activities and Education and Human Resources. This section shall be carried out using funds otherwise appropriated by law after the date of enactment of this Act.

(b) GRADUATE TRAINEESHIPS.—The Director of the National Science Foundation may establish a program to provide traineeships to graduate students at institutions of higher education within the United States who are citizens of the United States and who choose to pursue masters or doctoral degrees in quantum information science.

TITLE IV—DEPARTMENT OF ENERGY RESEARCH AND NATIONAL QUANTUM INFORMATION SCIENCE RESEARCH CENTERS

SEC. 401. QUANTUM INFORMATION SCIENCE RESEARCH PROGRAM.

(a) IN GENERAL.—The Secretary of Energy shall carry out a basic research program on quantum information science.

(b) PROGRAM COMPONENTS.—In carrying out the program required under subsection (a), the Secretary shall—

(1) formulate goals for quantum information science research to be supported by the Department of Energy;

(2) leverage the collective body of knowledge from existing quantum information science research;

(3) coordinate research efforts funded through existing programs across the Office of Science; and

(4) engage with other Federal agencies, research communities, and potential users of information produced under this section.

SEC. 402. NATIONAL QUANTUM INFORMATION SCIENCE RESEARCH CENTERS.

(a) IN GENERAL.—The Secretary of Energy shall ensure that the Office of Science carries out a program, in consultation with other Federal agencies, as appropriate, to establish and operate up to 5 National Quantum Information Science Research Centers to conduct basic research to accelerate scientific breakthroughs in quantum information science and technology and to support research conducted under section 401. Such centers shall be established through a competitive, merit-reviewed process, and consider applications from National Laboratories, institutions of higher education, research centers, multi-institutional collaborations, and other appropriate entities.

(b) COLLABORATIONS.—A collaboration receiving an award under this subsection may include multiple types of research institutions and private sector entities.

(c) REQUIREMENTS.—To the maximum extent practicable, the Centers developed, constructed, operated, or maintained under this section shall serve the needs of the Department of Energy, industry, the academic community, and other relevant entities to create and develop processes for the purpose of advancing basic research in quantum information science and improving the competitiveness of the United States.

(d) COORDINATION.—The Secretary shall ensure the coordination of, and avoid unnecessary duplication of, the activities of each Center with the activities of—

(1) other research entities of the Department, including the Nanoscale Science Research Centers, the Energy Frontier Research Centers, and the Energy Innovation Hubs; and

(2) industry.

(e) SELECTION AND DURATION.—

(1) IN GENERAL.—The centers selected and established under this section are authorized to carry out activities for a period of 5 years.

(2) REAPPLICATION.—An awardee may reapply for an additional, subsequent period of 5 years on a competitive, merit-reviewed basis.

(3) TERMINATION.—Consistent with the existing authorities of the Department, the Secretary may terminate an underperforming Center for cause during the performance period.

(f) FUNDING.—The Secretary of Energy shall devote $625,000,000 to carry out this section, which shall include $125,000,000 for each of fiscal years 2019 through 2023, subject to the availability of appropriations, to come from amounts made available for the Office of Science. This section shall be carried out using funds otherwise appropriated by law after the date of enactment of this Act.

SEC. 403. SPENDING LIMITATION.

No additional funds are authorized to be appropriated to carry out this Act and the amendments made by this Act, and this Act and such amendments shall be carried out using amounts otherwise available for such purpose.

The SPEAKER pro tempore. Pursuant to the rule, the gentleman from Texas (Mr. SMITH) and the gentlewoman from Texas (Ms. EDDIE BERNICE JOHNSON) each will control 20 minutes.

The Chair recognizes the gentleman from Texas.

GENERAL LEAVE

Mr. SMITH of Texas. Madam Speaker, I ask unanimous consent that all Members have 5 legislative days to revise and extend their remarks and to include extraneous material on H.R. 6227, the bill now under consideration.

The SPEAKER pro tempore. Is there objection to the request of the gentleman from Texas?

There was no objection.

Mr. SMITH of Texas. Madam Speaker, I yield myself such time as I may consume.

Madam Speaker, this bipartisan National Quantum Initiative Act is cosponsored by House Science, Space, and Technology Committee Ranking Member EDDIE BERNICE JOHNSON, as well as 24 other committee members. The bill has earned widespread support and was unanimously approved by the committee on June 27.

Before I explain what the bill does, I would like to explain why it matters so much.

In our lifetime, we have seen remarkable advances in the size and speed of our computers. Most of us carry phones in our pockets that are several thousand times more powerful than all the combined computing power available to NASA during the Apollo missions. Yet, as impressive as these advances have been, quantum computing has the power to affect an even more dramatic transformation of our society and worldwide technology.

Computers today rely on tiny on-off switches within a processing chip. Technological advances have made possible supercomputers that can perform series of on-off operations at astonishing speeds. But classical computing technology is nearing its limits. Each switch can only operate in one of two positions, off or on, zero or one.

Quantum computing is different. Rather than on-off switches, quantum computers rely on qubits. These are subatomic particles that can be both on and off at the same time. This enables quantum computers to perform complex calculations at speeds that are potentially millions of times faster than today's most advanced supercomputers.

Countries that harness the power of quantum computing will be able to revolutionize cybersecurity, healthcare, communications, financial services, and transportation, just to name a few of the industries.

The flip side of this is that quantum computing will make traditional IT security programs obsolete. The nation that develops quantum communications technology first may be able to decode, in a matter of seconds, other countries' sensitive national security information, proprietary technologies, and personal information.

Other countries are investing billions of dollars in new research facilities and equipment for quantum computing. China has publicly stated a national goal of surpassing the U.S. during the next decade. That is why it is imperative that we act now to develop a national quantum strategy and preserve America's dominance in the scientific world.

The National Quantum Initiative Act achieves this by creating a 10-year Federal program to accelerate quantum research and development in the United States. The bill leverages the expertise and resources of U.S. industry, academia, and government to move quantum information science to the next level of research and development.

The legislation enables a National Quantum Coordination Office within the White House Office of Science and Technology Policy. This office will oversee interagency coordination and strategic planning, serve as a central point of contact for stakeholders, conduct research, and promote commercialization of Federal research by the private sector.

The bill also supports basic research, education, and standards development at the National Institute of Standards

and Technology, the National Science Foundation, and the Department of Energy.

Madam Speaker, $225 million a year of these agencies' baseline funding will now be directed to new quantum research centers and laboratory research. Their activities will address fundamental research gaps, create a stronger workforce, and develop revolutionary knowledge and transformative innovations to give U.S. companies and workers an enduring competitive advantage.

The bill ensures that U.S. high-tech companies, which are investing heavily in quantum research, and a surge of quantum technology startups will contribute their knowledge and resources to a national effort.

H.R. 6227 was developed with input from industry, academia, national laboratories, Federal agencies, and the administration. It was an open and bipartisan process.

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The input of those stakeholders has yielded a strong consensus bill.

Additionally, Senator THUNE and Senator NELSON, the chairman and ranking member of the Senate Commerce Committee, have introduced a companion bill in the Senate. With bipartisan, bicameral support and the backing of the administration, I believe this bill could become law by the end of the year.

Let's take action to spur America's quantum development. I urge my colleagues to support this bill, and I reserve the balance of my time.

Ms. EDDIE BERNICE JOHNSON of Texas. Madam Speaker, I yield myself such time as I may consume.

Madam Speaker, I rise in support of H.R. 6227, the National Quantum Initiative Act.

I want to take a moment to thank Chairman SMITH for introducing this good legislation, of which I am a proud original cosponsor. I also want to express my appreciation for the deliberative, bipartisan process by which this bill was developed over the past year.

H.R. 6227 is the product of engagement with key stakeholders in industry, academia, and the Federal Government.

The Science, Space, and Technology Committee held a hearing on quantum technology last October. At that hearing, we heard from agency, university, and industry representatives about the recent breakthroughs in quantum sensing, quantum communication, and quantum computing. We also heard about the priorities for Federal investment in quantum research and the need for a strategic and coordinated approach going forward.

In addition to the hearing, committee staff held numerous bipartisan meetings and roundtables to inform the development of this bill.

Quantum information science and technology promises to revolutionize the way we solve problems. Many believe that quantum computing technology has the potential to accelerate progress on some of the most pressing challenges, including how to address climate change and understand complex diseases like cancer.

While it is difficult to predict how far-ranging the societal and economic impacts of quantum computing will be, recent breakthroughs demonstrate that we are rapidly clearing the necessary engineering hurdles. It is truly an exciting time for this bill and for the wide range of innovators who are planning to take advantage of these new breakthrough capabilities.

The race is on to build the world's first quantum computer capable of solving problems that have long eluded conventional computers. Not unlike the space race in the 1960s, the stakes in today's quantum race are high. Global leadership in quantum computing brings with it a military and intelligence edge, as well as a competitive advantage in what many expect to be a massive industry in decades to come.

At this time, when China, Europe, and Russia are investing heavily in quantum research and technology development, it is imperative that we do everything we can to maintain our global standing as the leader in this area. We must invest more in research. We need to ensure that we are educating and training the next generation of top quantum scientists and engineers. And we should do more to encourage partnerships between academia, industry, and government.

The National Quantum Initiative Act will set us on the right path. H.R. 6227 directs the President to establish a 10-year National Quantum Initiative Program, with the National Institute of Standards and Technology, the National Science Foundation, and the Department of Energy playing lead roles. Through the establishment of a national coordination office, an outside advisory committee, and an interagency working group, the program will take an integrated government approach to accelerating progress in quantum research and development.

I want to express my appreciation for the deliberative, bipartisan process by which we developed this legislation.

Mr. Speaker, I reserve the balance of my time.

Mr. SMITH of Texas. Mr. Speaker, first of all, I would like to thank the gentlewoman from Texas (Ms. EDDIE BERNICE JOHNSON) for those nice comments. And she is right, this was a very bipartisan effort and a very bipartisan bill.

Mr. Speaker, I yield 3 minutes to the gentleman from Texas (Mr. WEBER), who is also the chairman of the Energy Subcommittee of the Science, Space, and Technology Committee.

Mr. WEBER of Texas. Mr. Speaker, I rise in support of H.R. 6227, the National Quantum Initiative Act.

H.R. 6227 coordinates a Federal program to accelerate quantum research and development for the economic and national security of the United States.

Quantum technology is a field positioned to fundamentally change the way we move and process data. Theoretically, quantum computing could allow for the solutions to exponentially large problems, things that cannot be accomplished by even the fastest supercomputers today.

It could allow us, Mr. Speaker, to visualize the structures of complex chemicals and materials, to model highly detailed flows of potential mass evacuations with precise accuracy—with hurricanes abounding today, that is very, very important for us—and to quantify subatomic interactions on the cutting edge of nuclear research.

Quantum computing may also have profound implications for cybersecurity technology. And the gentlewoman from Texas alluded to this: Should China and Russia beat us to achieving quantum encryption, our current security encryption measures would be rendered obsolete. You heard Chairman SMITH, in his remarks, say that we could possibly decode their encryptions in a matter of seconds, if not minutes.

It is absolutely imperative, Mr. Speaker, that the U.S. maintain its leadership in this field. In order to achieve this kind of revolutionary improvement in technology, we need foundational knowledge in the advanced computing and materials science required to construct those quantum systems.

The Department of Energy, the DOE, Office of Science is the leading Federal sponsor of basic research in the physical sciences and robust quantum technology research. At Lawrence Berkeley National Lab, the National Energy Research Scientific Computing Center, NERSC, allows scientists to run simulations of quantum architectures.

At Argonne National Laboratory's Center for Nanoscale Materials, researchers study atomic-scale materials in order to engineer the characteristics of quantum information systems; and at Fermi National Accelerator Laboratory, scientists are applying their experience in high-energy physics to the study of quantum materials.

Earlier this year, I was privileged to invite several of my colleagues to join me on a visit to Argonne and Fermi labs, and we had the privilege of speaking with those very scientists conducting this groundbreaking research. It really is breathtaking and really is ground-shattering, if you ask me, in what it is going to do for science.

Support for basic research in computer science and for computational partnerships between industry, academia, and the national labs is absolutely necessary to develop the technology needed for future commercial quantum systems. For these reasons, I encourage my colleagues to join me in supporting H.R. 6227.

Ms. EDDIE BERNICE JOHNSON of Texas. Mr. Speaker, I yield 3 minutes to the gentleman from Illinois (Mr. LIPINSKI).

Mr. LIPINSKI. Mr. Speaker, I thank Ms. JOHNSON for yielding, and I thank her for her leadership on this bill.

I rise in support of this bipartisan legislation that will make a significant national commitment to the field of quantum science and engineering, which is critical for our global scientific and technological leadership.

While the benefits of quantum technology may still be a ways off, there is fierce international competition in this field, most notably from China, and we can't afford to waste any time. It is through strategic investments like this that we became the world's economic scientific and technology leader, and we can only maintain that position through continuing significant investment in cutting-edge basic research.

We already know that other countries are increasing their investments in quantum technology, in some cases guided by long-term strategies, and this bill will make sure that we develop a coherent strategy of our own.

This bill is a bright spot in what is otherwise a long, downward trend in Federal R&D funding as a percentage of GDP. Much as today's unbalanced budget leads to future debt problems, today's underinvestment in R&D leads to future innovation deficits.

I commend my colleagues from both parties for working together to bring this important bill to the floor, but we want to be clear that this is just a first step. We need to double down on our efforts and to reprioritize Federal research and development.

I want to highlight and commend an organization that is a leader in the field of quantum information science and engineering and that made significant contributions to this bill. The Chicago Quantum Exchange is a partnership between the University of Chicago, Argonne National Laboratory, and Fermi National Accelerator Laboratory.

I want to thank Chairman WEBER for bringing the Science, Space, and Technology Committee's Subcommittee on Energy out to Argonne and Fermi earlier this year. He spoke about some of the great work that they are doing there.

The Chicago Quantum Exchange was created to develop and grow interdisciplinary collaboration for the exploration and development of new quantum-enabled technologies and to help educate a new generation of quantum information scientists and engineers.

Partnership with the private sector is also an important element of the exchange. The Chicago Quantum Exchange serves as both an excellent model for the Multidisciplinary Centers for Quantum Research and Education envisioned in this bill and for what the future of R&D and quantum information science will look like.

Finally, I want to thank Chairman SMITH for his leadership on this bill and for working with us to make this a good, bipartisan piece of legislation.

Mr. Speaker, I urge my colleagues to support this bill.

Mr. SMITH of Texas. Mr. Speaker, I yield 2 minutes to the gentleman from California (Mr. ROHRABACHER), who has been a longtime and active member of the Science, Space, and Technology Committee, and also the former vice chairman of the committee.

Mr. ROHRABACHER. Mr. Speaker, I rise in support of H.R. 6227, the National Quantum Initiative Act. This act will move us toward a new millennium of computing.

Computers used to be big, really large, and the ways to make them more powerful was thought to be by making them bigger and bigger. Enormous mainframes filled entire office floors.

Well, after some very significant discoveries and development in the technological arena, we advanced this technology, making computers smaller, lighter, and more capable so we could send, for example, astronauts to the Moon. That led to more and more improvements, and now computers are in cars, are in our coffee machines and everything else that we do. They have gotten so small that most of us can carry them around and, perhaps, right now, are carrying them around in our pocket.

At this point now, we stand on the cusp of another giant leap forward for mankind, the quantum leap. By harnessing the natural properties of atomic and subatomic particles, we can develop the capabilities in the next decade that are far more capable than the systems that we marvel about today.

This act will coordinate our Federal activity, reduce waste and redundancy, and ensure that our efforts are strategic. This will keep us in advance, and way in advance, of our adversaries around the globe and ensure our security and our prosperity.

I ask my colleagues to join me in supporting this act and supporting a better future for America and the world.

Ms. EDDIE BERNICE JOHNSON of Texas. Mr. Speaker, I have no further requests for time, so I continue to reserve the balance of my time.

Mr. SMITH of Texas. Mr. Speaker, I yield 3 minutes to the gentleman from Illinois (Mr. HULTGREN), who is one of the few members of the Science, Space, and Technology Committee to actually be a member of three subcommittees. He is a member of the Energy Subcommittee, the Research and Technology Subcommittee, and the Space Subcommittee, and we appreciate his active service on the Science, Space, and Technology Committee.

Mr. HULTGREN. Mr. Speaker, I thank Chairman SMITH. I appreciate all of his hard work and success. And I also want to thank Ranking Member JOHNSON for her bipartisan work on this legislation, as well as her work on H.R. 589 that we will be getting over the finish line a little bit later in this series.

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Quantum computing represents a paradigm shift in the way that we are able to ask questions and comb through data when doing complex computational problems. Like many things we do at the Office of Science, this endeavor requires time, effort, and commitment.

Quantum computing was first theorized in the 1980s with researchers such as Richard Feynman, the physicist in my district I now know very well.

While every particle physicist draws Feynman diagrams to explain the interaction of subatomic particles, his later work in this field may have just as lasting an impact that he has had on the field.

I am proud to represent Fermilab in my district with the Feynman Computing Center on campus, and Fermilab is also a partner in the Chicago Quantum Exchange with Argonne, the University of Chicago, and other partners to further develop quantum systems outside of just computing.

I look forward to the advancements this research will provide, but, more importantly, the people we will be able to help.

We are getting to the point where we can actually use the reams of data we first got out of our genome project, and our ability to better use this and other data will help us find more targeted cures and develop better treatments.

Similar to what we are doing in this legislation, I also want to thank the chairman and ranking member for their efforts on the Department of Energy Research and Innovation Act.

This legislation contains a number of sections from legislation I introduced to improve the ability of our national labs to get ideas out of the lab and into the private sector.

The increased flexibility this legislation gives to the labs will allow them to better work with universities and the private sector when there are capabilities that only exist in our labs.

These labs have been a passion of mine, with the ability to see two of them up close in Illinois. I have seen the innovation engine they can be, not just for our Nation, but for local and regional economies.

It is vital that we continue to support our laboratories, which host more than 32,000 researchers from across the Nation, touching nearly, if not every, university in the United States.

This legislation gives the Office of Science clear direction on their mission, and I am pleased that we could work with the Senate to get this to the President's desk after this vote series.

Again, I thank the chairman for yielding. I urge passage of these important bills.

Ms. EDDIE BERNICE JOHNSON of Texas. Mr. Speaker, I have no further requests for time.

I urge support of the bill, and I yield back the balance of my time.

Mr. SMITH of Texas. Mr. Speaker, I have no other requests for time either,

and I yield back the balance of my time.

The SPEAKER pro tempore (Mr. WOODALL). The question is on the motion offered by the gentleman from Texas (Mr. SMITH) that the House suspend the rules and pass the bill, H.R. 6227, as amended.

The question was taken; and (two-thirds being in the affirmative) the rules were suspended and the bill, as amended, was passed.

A motion to reconsider was laid on the table.

DEPARTMENT OF ENERGY RESEARCH AND INNOVATION ACT

Mr. SMITH of Texas. Mr. Speaker, I move to suspend the rules and concur in the Senate amendment to the bill (H.R. 589) to establish Department of Energy policy for science and energy research and development programs, and reform National Laboratory management and technology transfer programs, and for other purposes.

The Clerk read the title of the bill.

The text of the Senate amendment is as follows:

Senate amendment:

Strike title IV.

The SPEAKER pro tempore. Pursuant to the rule, the gentleman from Texas (Mr. SMITH) and the gentlewoman from Texas (Ms. EDDIE BERNICE JOHNSON) each will control 20 minutes.

The Chair recognizes the gentleman from Texas.

GENERAL LEAVE

Mr. SMITH of Texas. Mr. Speaker, I ask unanimous consent that all Members may have 5 legislative days in which to revise and extend their remarks and to include extraneous materials on H.R. 589, the bill now under consideration.

The SPEAKER pro tempore. Is there objection to the request of the gentleman from Texas?

There was no objection.

Mr. SMITH of Texas. Mr. Speaker, I yield myself such time as I may consume.

Mr. Speaker, H.R. 589, the Department of Energy Research and Innovation Act, is the product of more than 4 years of work by the Science Committee to advance basic research in science and technology and set clear science priorities for the Department of Energy.

Mr. Speaker, I want to thank my colleagues on the Science Committee who have sponsored this legislation with me, particularly Ranking Member EDDIE BERNICE JOHNSON, Vice Chairman FRANK LUCAS, Energy Subcommittee Chairman RANDY WEBER, Energy Subcommittee Vice Chairman STEVE KNIGHT, and Energy Subcommittee members DANA ROHRABACHER, MO BROOKS, NEAL DUNN, RANDY HULTGREN, MARC VEASEY, ZOE LOFGREN, DAN LIPINSKI, and PAUL TONKO, as well as full committee members BARBARA COMSTOCK, BRIAN BABIN, ANDY BIGGS, CLAY HIGGINS, ELIZABETH ESTY, and ED PERLMUTTER.

Six standalone Science Committee energy research bills from last Congress are included in this legislation.

The DOE Research and Innovation Act prioritizes critical basic research and science at the DOE national labs. It provides the first comprehensive authorization for Office of Science programs, which conduct and support more than $6 billion in research each year.

This legislation also requires DOE to coordinate research across the Department. It provides private industry with increased access to the unique user facilities and capabilities of the national labs that will help to develop advanced technologies for the next generation.

Title I of H.R. 589 improves the technology transfer process between DOE and private industry.

The innovative early stage research performed at the national labs can have great value to the private sector. While the labs consistently develop ideas and technology that have commercial potential, Federal red tape and bureaucracy discourage the cooperation needed for the private sector to take technologies to market.

Title I enables national lab directors to better partner with industry and ensure that the United States can remain a world leader in science and technology.

Mr. Speaker, I thank the gentleman from Illinois, Representative RANDY HULTGREN, and the gentleman from Colorado, Representative ED PERLMUTTER, for their initiative on this issue and for sponsoring similar legislation in the last Congress to advance these important reforms at our national labs.

Title II of the legislation requires DOE to better manage and coordinate research efforts at the Department of Energy.

This title also requires DOE to provide a regular analysis of science and technology activities within the Department. This will identify key areas for collaboration across science and applied research programs, and allow the Secretary to identify programs that cost too much and could be better undertaken by the private sector.

Title III establishes priorities and provides statutory direction for the basic research programs within the DOE's Office of Science. This includes research and basic energy sciences, biological and environmental research, high-performance computing, nuclear physics, high-energy physics, and fusion energy science.

These basic research programs are central to the mission of the Department. Investment in this research can lead to new scientific discoveries that will maintain U.S. leadership in technology and innovation.

This title also authorizes basic research programs in solar fuels, electricity storage, exascale computing, and low-dose radiation.

The House has previously passed Science Committee legislation by Energy Subcommittee Vice Chairman KNIGHT and subcommittee member HULTGREN to authorize these four key basic research programs.

H.R. 589 represents a bipartisan, bicameral agreement to modernize and increase the productivity of the DOE national lab system, streamline DOE research programs, and prioritize the basic scientific research that will maintain American leadership in science.

Mr. Speaker, I urge my colleagues to support this bill, and I reserve the balance of my time.

Ms. EDDIE BERNICE JOHNSON of Texas. Mr. Speaker, I rise today to support the final passage of H.R. 589, the Department of Energy Research and Innovation Act, for which I am pleased to be a cosponsor.

The bill before us today is a result of constructive negotiations with our majority and with our colleagues in the Senate over the last 2 years. I am also pleased to note that many of the provisions in this bill actually were proposed first in the version of the America COMPETES Reauthorization Act, and that was sponsored by every Democratic member of the committee last Congress.

This bill includes what would be the first comprehensive authorization of the DOE Office of Science, which is the largest supporter of physical sciences research in the country. This is a $6.6 billion office that manages 10 of our national laboratories, often called the crown jewels of our national research infrastructure.

Yet, thus far, unlike NSF, NASA, and nearly every other major scientific research agency stewarded by the Federal Government, the Office of Science has not received the statutory guidance and support that its capabilities and mission warrant. So passing this portion of the bill into law alone would be a big step in the right direction.

The bill also includes a number of important technology transfer provisions that previously passed the House as part of a bipartisan bill that I and many of my colleagues on the committee cosponsored.

In addition, it would provide the first authorization of the promising Innovation Hub model for energy research, and it would enable greater private sector management of ARPA-E.

Mr. Speaker, I would like to thank Chairman SMITH and his staff for working closely with us and our Senate counterparts to find common ground in each of these areas, as I believe they will be critical to ensuring our Nation's competitiveness and our clean energy future.

Mr. Speaker, I urge my colleagues to support this bill, and I reserve the balance of my time.

Mr. SMITH of Texas. Mr. Speaker, I yield 2 minutes to the gentleman from Texas (Mr. WEBER), who is the chairman of the Energy Subcommittee of the Science Committee.