

## [First Look: National Quantum Initiative Act \(S 3143/ HR 6227, 115th Congress\)](#)

Supports the United States' leadership in the research and development of quantum science and technology.

Updated last **August 3, 2018**

for the 6/26/2018 version of S 3142 and HR 6227.



### WHAT IT DOES

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Bills [S 3143](#) and [HR 6227](#) are related proposals in the Senate and House to support the United States' leadership in the research and development of quantum science and technology. The two overarching aims of these bills is to strengthen the country's quantum science research capabilities and workforce as well as improve Federal planning and coordination of quantum science as it is used by the government.

To accomplish these aims, Title I of bills S 3143 and HR 6227, "National Quantum Initiative", call for the creation of investments in quantum science and technology through 2030 including:

- National Quantum Initiative Program – a ten-year initiative of the White House to coordinate Federal agencies, Academia, and Industry goal-setting and investment in quantum science.
- National Quantum Coordination Office – a new office, directed by an [Office of Science and Technology Policy](#) appointee and in collaboration with the [National Science Foundation](#), [Department of Commerce](#), and the [Department of Energy](#), to fund and disseminate quantum science research.
- Subcommittee on Quantum Information Science – a new subcommittee within the [National Science and Technology Council](#) to coordinate Federal quantum initiatives and projects as well as publish national strategic plans and reports to Congress identifying national progress, needs, and challenges for quantum science. Specific agencies included in this subcommittee will include representatives from:
  - The [National Institute of Science and Technology](#) (NIST, chair);
  - The [National Science Foundation](#) (NSF, chair);
  - The [Department of Energy](#) (DOE, chair);
  - The [National Aeronautics and Space Administration](#);
  - The [Department of Defense](#);
  - The [Office of National Intelligence](#);
  - The [Office of Management and Budget](#); and
  - The [Office of Science and Technology Policy](#).
- National Quantum Initiative Advisory Committee – a new committee of quantum science stakeholders within and outside of the government to advise the President and Subcommittee on Quantum Information Science with independent assessments of the National Quantum Initiative Program. This Committee will report to the President no less than 6 months after the bills' passing and at least once every two thereafter. A copy of these reports will also be provided to the [House Committee on Science, Space, and Technology](#) as well as the [Senate Committee on Commerce, Science, and Transportation](#).

Under title II of bills S 3143 and HR 6227, "National Institute of Standards and Technology Quantum Activities", NIST is directed to assist the Initiative described in title I. Specifically, NIST is to:

- Continue supporting and expanding its investment in establishing measurements and standards for quantum science;

- Assist the Initiative by coordinating, funding, and promoting existing quantum projects throughout the [National Laboratories](#), industry, and academia;
- Convene a workshop of quantum science stakeholders, within a year of the bills' passing, to identify key opportunities, challenges, and gaps in quantum science research; and
- Report a summary of its findings from this workshop to the [House Committee on Science, Space, and Technology](#) as well as the [Senate Committee on Commerce, Science, and Transportation](#) within two years of the bills' passing.

To accomplish this directive, NIST will be provided up to \$80 million dollars annually from the Department of Commerce from 2019 till 2023.

Under title III of bills S 3143 and HR 6227, "National Science Foundation and Multidisciplinary Centers for Quantum Research and Education", the [NSF](#) is directed to carry out research and education programs to bolster quantum science research. Specifically, the NSF is directed to:

- Collaborate with other relevant Federal agencies to improve the teaching of quantum science at the undergraduate, graduate, and postgraduate levels;
- Increase the diversity of participation in quantum science and research; and
- Coordinate and disseminate quantum science research throughout the relevant research communities.

The NSF is also directed to work with other relevant Federal agencies to award grants to institutes of higher education and/or eligible nonprofits to create up to five Multidisciplinary Centers for Quantum Research and Education. These Centers will facilitate the following:

- Continuing the advancement of quantum science, research, and education; and
- Support quantum science innovations and workforce opportunities.

Eligible candidates for funding to establish a center must apply to the NSF and include the following information:

- Details as to how the Center will collaborate with other quantum science stakeholders to leverage resources and expertise;
- Plans to support interdisciplinary research and development endeavors involving quantum science;
- A description of how the Center's quantum science research efforts will foster innovation and assets to the national quantum information science workforce; and
- Strategies for the Center to become self-sustaining.

As with title II, the directives described here will be funded by the NSF in the amount of \$50 million annually until 2023.

Under title IV of bills HR 6227 (note S 3143 only includes titles I-III), "Department of Energy Research and National Quantum Information Science Research Centers", the [DOE](#) is directed to create and pursue its own goals in basic quantum information science research and development. To do so, the DOE is to establish and coordinate up to five National Quantum Science Research Centers through a competitive, merit-reviewed grant process eligible to the [National Laboratories](#), academia, and other research centers. Selected candidate Centers will collaborate with the DOE research centers including the [Nanoscale Science Research Centers](#), the [Energy Frontier Research Centers](#), and the [Energy Innovation Hubs](#). Selected candidate Centers will also receive funding for five years with the opportunity to reapply for an additional five years of funding. Up to \$125 million dollars from the DOE will be available annually until 2023 to fund these Centers.

#### RELEVANT SCIENCE

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While traditional computers rely on storing and reading information in binary bits, [quantum computers](#) make use of new understandings of quantum mechanics that allow information to be read and stored exponentially faster and simultaneously on non-binary quantum bits or "qubits". While quantum computing can exponentially increase the abilities of single computers,

advancement in high-performance computing enables the simultaneous application of multiple sets of computers, called “clusters”, to solve problems. Both quantum and high-performance computing allow for faster and more efficient problem solving, however these new capabilities could also be applied to nefarious uses that will have to be guarded against.

#### STATUS

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Bill S 3143 was first introduced in the Senate on June 26, 2018 and referred to the Senate [Committee on Commerce, Science and Transportation](#). On August 1, 2018, the Committee on Commerce, Science and Transportation reported the bill favorably.

Bill HR 6227 was introduced in the House on June 26, 2018 and subsequently referred to the House [Committee on Space, Science, and Technology](#).

#### SPONSORS

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Sponsor: [Senator John Thune \(R-SD\)](#)

Cosponsors:

- [Senator Bill Nelson \(D-FL\)](#)
- [Senator Cory Gardner \(R-CO\)](#)
- [Senator Kamala Harris \(D-CA\)](#)

Sponsor: [Lamar Smith \(R-TX-21\)](#)

[Cosponsors:](#)

- 20 Republicans
- 13 Democrats

#### PRIMARY AUTHOR

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#### RECOMMENDED CITATION

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