NPI NATIONAL PHOTONICS INITIATIVE

NATIONAL QUANTUM INITIATIVE CRITICAL TO LONG-TERM ECONOMIC COMPETITIVENESS OF U.S.

Since the National Quantum Initiative (NQI) Act was approved with overwhelming bipartisan support and signed into law in 2018, the National Photonics Initiative (NPI) has been working with Agencies and lawmakers to implement the legislation and expand federal investment in Quantum Information Science (QIS) research.

Quantum research activities already underway at the National Institute of Standards and Technology (NIST), National Science Foundation (NSF) and Department of Energy (DOE) must be sustained and expanded to maximize the impact of the NQI. Additionally, the authorized funding provided in the NQI Act for NSF and DOE quantum centers must continue to be appropriated on a strategic timeline.

The NPI recommends the following funding levels for Fiscal Year '21:

- **NIST: $80 million for QIS research and activities, as authorized in the NQI Act**
- **NSF: $210 million - $10 million each for five quantum centers and $160 million for QIS research**
- **DOE: $245 million - $25 million each for five quantum centers and $120 million for QIS research, including $25 million for the DOE Office of Science to support early stage research for Quantum Internet**

Previously, the following funding amounts were approved in Fiscal Year '20:

- NIST: $40 million for the Scientific & Technical Research & Services Account
- NSF: $106 million for the Research & Related Activities Account
- DOE: $195 million for Office of Science Account

CONTINUED QUANTUM RESEARCH INVESTMENT IS NEEDED

As it is implemented, the NQI will help bridge significant research and development gaps between leading quantum researchers and industrial product developers. It will also help catalyze a new sector in the science, technology, engineering and math (STEM) workforce. The NQI establishes a framework that will:

- Engage and produce a world-leading industrial quantum technology workforce;
- Engineer, industrialize and automate quantum technology, including quantum computers, communications systems and sensors;
- Provide access to emerging quantum computer and communications systems; and,

- Develop conventional technology and intellectual property needed to support and enable quantum technology.

U.S. MUST STAY COMPETITIVE GIVEN FOREIGN INVESTMENTS IN QUANTUM

Many countries are investing heavily in QIS research.

- China has been aggressive in its commitment to quantum, recently launching a satellite devoted to quantum communication protocols. The Chinese investment in quantum is reported to be about $10 billion.
- European entities have recently established large academic/industrial initiatives focused on QIS including the European Union (EU) Flagship Quantum Program which dedicates $1.3 billion over five years.

QUANTUM TECHNOLOGY AND APPLICATIONS

Quantum holds great potential to revolutionize many sectors of the economy including healthcare, financial services, transportation, manufacturing and weather prediction. These include:

Increased Computational Power

- Quantum technology will be able to rapidly sort through data sets that are too large to be stored on conventional devices, such as real-time video of the entire surface of the earth. Potential uses for this technology include autonomous vehicle navigation, weather prediction, machine learning, economic market analysis, code-breaking and logistics for energy and transportation systems.

Development of New Innovative Materials

- Quantum technology will simulate the behavior of complex molecules and materials beyond the reach of conventional computers. This technology could yield the discovery of new substances with exotic electrical/mechanical properties, designer molecules for efficient drug activity, and efficient materials for the conversion of energy between light and electricity.

Secure Communications

- All financial transactions conducted over the internet (paying bills, using ATMs) require secure communications. Quantum communication can improve the robustness of these secure communications.

ABOUT THE NPI

The National Photonics Initiative (NPI) is a collaborative alliance among industry, academia and government to raise awareness of photonics and the impact of photonics on our everyday lives. For more information, visit www.lightourfuture.org or contact David Lang at 202.416.1499 or Jennifer O'Bryan at 202.246.7348