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DEPARTMENT OF COMMERCE

National Institute of Standards and Technology

[Docket Number: 150218152-5152-01]

Request for Information on Quantum Information Science and the Needs of U.S. Industry

AGENCY: National Institute of Standards and Technology, U.S. Department of Commerce.

ACTION: Notice; Request for Information (RFI).

SUMMARY: The National Institute of Standards and Technology (NIST) requests information about the broader needs of the industrial community in the area of quantum information science (QIS). NIST requests this information through its role in the Interagency Working Group on Quantum Information Science of the National Science and Technology Council (NSTC) Committee on Science (CoS) Subcommittee on Physical Sciences (PSSC). NIST seeks input from stakeholders regarding opportunities for research and development, emerging market areas, barriers to near-term and future

applications, and workforce needs. The information received in response to this RFI will inform and be considered by the Interagency Working Group making recommendations for the development and coordination of U. S. Government policies, programs, and budgets to advance U.S. competitiveness in QIS.

DATES: Comments must be received by 5:00 PM Eastern time on [**INSERT DATE 30 DAYS AFTER FEDERAL REGISTER PUBLICATION**]. Written comments in response to the RFI should be submitted according to the instructions in the SUPPLEMENTARY INFORMATION section below.

ADDRESSES: Written comments may be submitted only by email to Dr. Claire Cramer at claire.cramer@nist.gov in any of the following formats: ASCII; Word; RTF; or PDF. Please include your name, organization's name (if any), and cite "Quantum Information Science Industry RFI" in the subject line of all correspondence. All comments will be made publicly available at http://www.nist.gov/pml/div684/posted-comments-for-rfi.cfm as submitted. Accordingly, proprietary or confidential information should not be included in any comments, as they will be posted without change.

FOR FURTHER INFORMATION CONTACT: For further information contact Gail Newrock, Carl Williams, or Claire Cramer by email at qisiwg@nist.gov, or Gail Newrock by phone at (301) 975-3200. Please direct media inquiries to NIST's Office of Public Affairs at (301) 975-2762.

SUPPLEMENTARY INFORMATION:

Twenty years of research and development work in QIS is producing the first niche applications, and there is an increasing level of international activity in the field. The Interagency Working Group in QIS was chartered in October 2014 to develop and coordinate policies, programs, and budgets for QIS research and development to create the scientific basis, infrastructure, future technical workforce, and intellectual property that will be required to address agency missions and secure future U.S. competitiveness in quantum information science. The Interagency Working Group includes participants from the Departments of Commerce, Defense, and Energy; the Office of the Director of National Intelligence; and the National Science Foundation.

NIST seeks input from stakeholders regarding opportunities for research and development, emerging market areas, barriers to near-term and future applications, and workforce needs. The information received in response to this RFI will inform and be considered by the Interagency Working Group making recommendations for the development and coordination of U. S. Government policies, programs, and budgets to advance U.S. competitiveness in QIS.

Written comments may be submitted only by email to Dr. Claire Cramer at claire.cramer@nist.gov in any of the following formats: ASCII; Word; RTF; or PDF. Please include your name, organization's name (if any), and cite "Quantum Information Science Industry RFI" in the subject line of all correspondence.

REQUEST FOR INFORMATION: The objective of this request for information is to inform the Interagency Working Group making recommendations for the development and coordination of U. S. Government policies, programs, and budgets to advance U.S. competitiveness in QIS. The questions below are intended to assist in the formulation of comments and should not be construed as a limitation on the number of comments that interested persons may submit or as a limitation on the issues that may be addressed in such comments. Comments containing references, studies, research, and other empirical data that are not widely published should include copies of the referenced materials. Again, note that all comments will be made publicly available as submitted; therefore proprietary or confidential information should not be included. NIST is specifically interested in receiving input pertaining to one or more of the following questions:

(1) Opportunities

Quantum information science includes, for example, quantum computing and processing, quantum algorithms and programming languages, quantum communications, quantum sensors, quantum devices, single photon sources, and detectors. What areas of pre-competitive QIS research and development appear most promising? What areas should be the highest priorities for Federal investment? What are the emerging frontiers? What methods of monitoring new developments are most effective?

(2) Market Areas and Applications

The 2009 "Federal Vision for Quantum Information Science" [1] identified exciting new possibilities for QIS impact, including mineral exploration, medical imaging, and quantum computing. Now, six years later, what market areas do you think would most benefit from quantum information science?

(3) Barriers

Funding levels and mechanisms, technology, dissemination of information, and technology transfer are some of the potential barriers to adoption of QIS technology. What do you see as the greatest barriers to advancing important near-term and future applications of QIS? What should be done to address these barriers?

(4) Workforce Needs

Addressing opportunities in QIS and barriers to applications requires a workforce spanning many disciplines, ranging from computer science and information theory to atomic scale manipulation of materials, and possessing a range of knowledge and skills. What knowledge and skills are most important for a workforce capable of addressing the opportunities and barriers? In what areas is the current workforce strong, and in what areas is it weak? What are the best mechanisms for equipping workers with the needed knowledge and skills?

[1] http://www.nist.gov/pml/div684/upload/FederalVisionQIS.pdf

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