



QUANTUM INFORMATION SCIENCE AND TECHNOLOGY

The Naval Research Laboratory (NRL) is seeking proposals for innovative research both in underlying information technology and in scalable component technology for quantum information systems.

The goal of the NRL Quantum Information Science and Technology (QuIST) program is to demonstrate advances required for practical use of quantum logic and information in computing, communications, and other applications. Specific areas of interest include:

- 1) Fault-tolerant algorithms and architectures;
- 2) Formulation of new algorithms and protocols for ultra-secure communications, ultra-precise metrology, information-bandwidth enhancements;
- 3) Limits of quantum computation for speedups over classical computation, and
- 4) Computational applications for which quantum computation offers significant advantage over known classical equivalents.

Concurrently with these fundamental advances, QuIST seeks to develop the component technology for quantum computing and secure quantum communication including the development of robust megahertz rate single photon sources and detectors, practical implementations of single and multiple quantum bit logic gates, quantum memory, and systems level constructs such as quantum repeaters. The program is aimed at developing theory, hardware, and integrated demonstrations that may include scalable assemblies of quantum logic and memory, quantum teleportation-based communication, ultra-precise clock synchronization, communication of quantum information over large distances, and network backbones based on coherent optical and quantum techniques.

Proposals are not limited to the specific technical topic areas listed above and alternative visions will be considered. However research should result in prototype hardware and/or software demonstrating integrated concepts and approaches. Specifically excluded is research that primarily results in evolutionary improvement to the existing state of practice or focuses on a specific system or solution. Integrated solution sets embodying significant technological advances are strongly encouraged over narrowly defined research endeavors.

Address White Papers (WP) to Code 6301 or [e-mail](#), telephone (202) 767-2926. Allow one month before requesting confirmation of receipt of WP if confirmation is desired. Substantive contact should not take place prior to evaluation of a WP by NRL. If necessary, NRL will initiate substantive contact.