

ITL Opportunity Description Template

TITLE: Experimental Quantum Network Science & Timing Metrology (U.S. Citizens preferred)

Overview: The Information Technology Laboratory of the National Institute of Standards and Technology is seeking qualified candidates for the position of research physicist. The position will be a research physicist performing advanced quantum network synchronization and timing experiments based on single-photon detection. The position requires the development of novel quantum network protocols, systems and tools that will be deployed in challenging field experiments for the purpose of quantum network node synchronization at the single-photon level. Field experiments include high-precision synchronization of measurement and control functions in quantum network nodes. We will extend faint-light clock recovery towards two-way time transfer protocols based on single-photon detection. The experiments will first be conducted over a campus-scale testbed, towards integration of an effective two-way time transfer protocol co-existing with entanglement distribution and entanglement swapping over metropolitan scales.

Key responsibilities will include but are not limited to:

- Work with NIST researchers, academia, and industry to develop and test quantum networking synchronization methods and protocols.
- Synchronization of network nodes to sub-10 ps levels on metropolitan scales using clock-recovery, two-way time transfer based on single-photon detection and high-accuracy time-precision protocols.
- Characterization of single-photon detectors and sources for the purpose of time transfer.
- Presenting results at internal and external meetings and conferences.
- Producing high-quality publications based on research and results.
- Ensuring that all measurement data, results, protocols, software, and documentation have been archived or otherwise transmitted to the larger organization.
- Adhere to all safe operating procedures and actively participate in hazard reviews.

Qualifications

- US citizenship preferred.
- A PhD degree in Physics, Electrical Engineering or related field.
- 3 or more years of relevant experimental experience
- Must be able to work in a team-driven environment.
- Must have an independent work attitude.
- Background and experience in quantum information science and quantum networking.
- Proven experience using single-photon sources and detectors for quantum measurements.
- FPGA programming experience is highly desired for this position.
- Experience with automation of measurement equipment using Python.
- Extensive programming skills in Matlab and/or Python for software integration, data analysis and data acquisition.
- Strong oral and written communication skills.
- Demonstrated ability to conduct independent, collaborative, multi-disciplinary research
- Must have an aptitude and patience to perform precision measurements
- U.S. citizenship is preferred for this position.

Employment Terms: This opportunity is to be an associate researcher in the NIST Quantum Information Group, with options to renew. Associate researchers are NOT Federal Employees, but they work as NIST researchers.

Salary: \$85,000-\$90,000

How to express interest: Candidates (US Citizens preferred) who meet all of the required qualifications and who would be interested in taking this position are invited to express their interest in the position by sending an updated CV to Dr. Thomas Gerrits (gerrits@nist.gov) and Dr. Joshua Bienfang (bienfang@nist.gov)