Postdoc Position Description

Principal Objectives:
Candidate will share responsibility for establishing and operating a new, quantum optics research laboratory by constructing basic laboratory infrastructure as well as creating the metrology tools necessary to make quantum optics measurements. Candidate will implement techniques necessary to approach or reach the quantum limit, including homodyne tomography, laser beam diagnostics, noise characterization, mechanical stabilization, and electronic feedback methods. Candidate will make use of and strengthen a diverse array of skills through hands-on, manual tasks as well as software development and data analysis.

General Duties and Responsibilities:
- Design and construct optical processing and detection systems using free-space components which maximize mode matching and minimize optical loss.
- Implement feed-back control systems to stabilize optical frequency, phase, polarization, and mechanical motion to enable coherent optical measurements.
- Design and construct low-noise electronic circuits for detection, control, and measurement.
- Create software for collection and analysis of homodyne tomography measurements of quantum states.
- Perform diagnostic measurements to characterize the noise properties of a laser source.
- Construct infrastructure in support of a quantum optics research laboratory.
- Provide technical input to research problems which have been recognized as critical obstacles to progress in areas of exceptional interest.
- Work as a member of a collaborative, interdisciplinary team.

Knowledge, Skills, and Abilities:
- Experience with lasers, light sources, phase-locked loops, balanced detection, low-noise receive design, polarization optics, and optical modulators.
- Experience with optical measurement techniques such as: coherent detection, quantum tomography, beam diagnostics, laser diagnostics, noise characterization, and statistical optics.
- Experience with protocols used in traditional, coherent optical networks is very desirable.
- Ability to code with, or learn to code with: MATLAB, LabView, and Python is required.
- Familiarity with optical system design software (e.g. Zemax, Code V, OSLO) is advantageous.
- Ability with opto-mechanical design and machine shop fabrication is desirable.
- Familiarity with building materials, hardware, and basic construction and assembly methods.
- Comfortable working with hands doing manual tasks.

For more information contact:
Tasshi Dennis (tasshi@nist.gov).
Hamid Fardi (hamid.fardi@ucdenver.edu).
Mark Golkowski (mark.golkowski@ucdenver.edu).