Abstract Submitted
for the DAMOP17 Meeting of
The American Physical Society

Absolute Calibration of Analog Photodiodes with Correlated Twin Beams from Four-wave Mixing MENG-CHANG WU, BRIAN ANDERSON, BONNIE SCHMITTBERGER, Joint Quantum Institute, National Institute of Standards and Technology and the University of Maryland, College Park, MD 20742, USA, ALAN MIGDALL, PAUL LETT, Joint Quantum Institute, National Institute of Standards and Technology and the University of Maryland, Gaithersburg, MD 20899, USA — Quantum-correlated twin beams are a promising source for absolute calibration of analog photodiodes over a large frequency range. In our experiment, we make two-mode squeezed light with four-wave mixing in a double-lambda scheme in a warm Rb vapor. At least -5 dB of intensity-difference squeezing in the measurement frequencies range of 100Hz to a few megahertz is obtained routinely. One of the correlated twin beams is detected by a first uncalibrated detector and this provides a reference for signals at a second uncalibrated detector. Fluctuations in one detector should be mirrored in the other, and any inefficiency of the photodiodes, or losses in the optical path for the twin beams will reduce the degree of their correlation. We can obtain the quantum efficiency of both analog photodiodes in the test by measuring the correlation functions of twin beams and having good loss measurements for all of the optical paths. We measure the losses of every optical element and the loss from the Rb atoms in the source. The main contributions to the uncertainties of the calibration are from the loss measurements.

Meng-Chang Wu
Univ of Maryland-College Park

Date submitted: 27 Jan 2017 Electronic form version 1.4