Abstract Submitted
for the APR15 Meeting of
The American Physical Society

Single Photon Interference with Spontaneous Parametric Downconversion Source PRESTON ALEXANDER, SCOTT BALDWIN, S. BLANE MCCRACKEN, R. SETH SMITH, Francis Marion University — During the past two years, a Quantum Optics Laboratory was constructed and tested at Francis Marion University. A spontaneous parametric downconversion source was used to create pairs of correlated photons for use in single photon tests of quantum mechanics. In this experiment, single photon interference was demonstrated by using a spontaneous parametric downconversion source. The two beams emanating from the downconversion crystal are referred to as the signal and idler beams. Detector A was placed in front the idler beam. The signal beam was sent to a polarization interferometer that was followed by a 50/50 beam splitter. The reflected and transmitted beams were incident on Detectors B and B'. By observing the presence or absence of coincidences, it was possible to demonstrate both particle and wave behaviors for light. In particular, if individual photons are passed through a polarization interferometer, it was shown that they will interfere with themselves. The details of the experimental setup and the results will be presented.

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Date submitted: 08 Jan 2015 Electronic form version 1.4