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Characterization of a Spontaneous Parametric Downconversion Source for Use in Single Photon Tests of Quantum Mechanics PRESTON ALEXANDER, JACKSON MCDONLD, JASON HARRINGTON, R. SETH SMITH, Francis Marion University — During the past year, 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. Photons from a spontaneous parametric downconversion source were detected with single photon counting modules that were purchased through the Advanced Laboratory Physics Association (ALPHA). The effect of pump polarization on the output intensity was studied. Coincidences between pairs of correlated photons were counted and plotted as a function of the angle between the single photon detectors, in order to perform a test of Conservation of Momentum. The laboratory will be used to perform single photon tests of quantum mechanics, including the Grangier experiment, single photon interference, quantum state measurement, and tests of local realism.

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