Timing Of A Fast Optical Switch

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Overview
This project focused on the characterization of a Rubidium Titanyl Phosphate (RTP) Pockels cell, which can be utilized as an electro-optic modulator driven by a high voltage pulse. The birefringent RTP crystal has a linear electro-optic effect known as the Pockels effect whereby an applied electric field alters the refractive indices of the medium. Photons passing through the cell at high applied voltages will experience a phase delay between polarization components. This project aimed to study this phenomenon with fast voltage modulation speeds.

Experimental Setup

Analysis
Fourier analysis was performed to identify the noise power spectrum in the system. Additionally, a timing analysis was conducted to yield the rise, pulse width, and recovery times.

Impact
This work was completed to assist in a broader project involving quantum entanglement and quantum computing. In particular, this experiment is responsible for selecting the polarization basis of single photons which acts as a secure key for information transfer.

References

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