Beam steering by KTN crystal (Potassium tantalate niobate)

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Testing the Performance of the One-dimensional KTN Optical Scanner

Hongwei Chen
Advisor: Dr. Qiwen Zhan, PhD

Research Objective: To test the performance of the one-dimensional KTN (Potassium tantalate niobate) optical scanner from several aspects, such as deflection angle, deflection efficiency, resolution, frequency and time dependence.

Methodology
- KTN scanner is set up on a breadboard.
- Applied voltage is provided by a wavefront generator with a high voltage amplifier.
- Temperature controller is required to keep the state of KTN crystal steady.
- Data is collected by CCD.

Project Progress and Future Work
- System is still being adjusted for the bad beam quality and alignment, even a change of 0.05mm will influence the profile.
- Though, scanning phenomenon is still observed.
- Once the little dot is obtained, data can be immediately collected. Also, we will test deflection efficiency, resolution, frequency and time dependence.
- Large deflection angle with relatively low applied voltage is expected.

Introduction
- Kerr effect: second order electro-optical effect.
- Two essential factors: an Ohmic contact and large dielectric constant.
- Linearly graded refractive index induced.
- Optical beam cumulatively deflected.

![Deflection angle as a function of applied voltage](image1)

Set up of the KTN scanner with temperature controller