

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.

Introduction

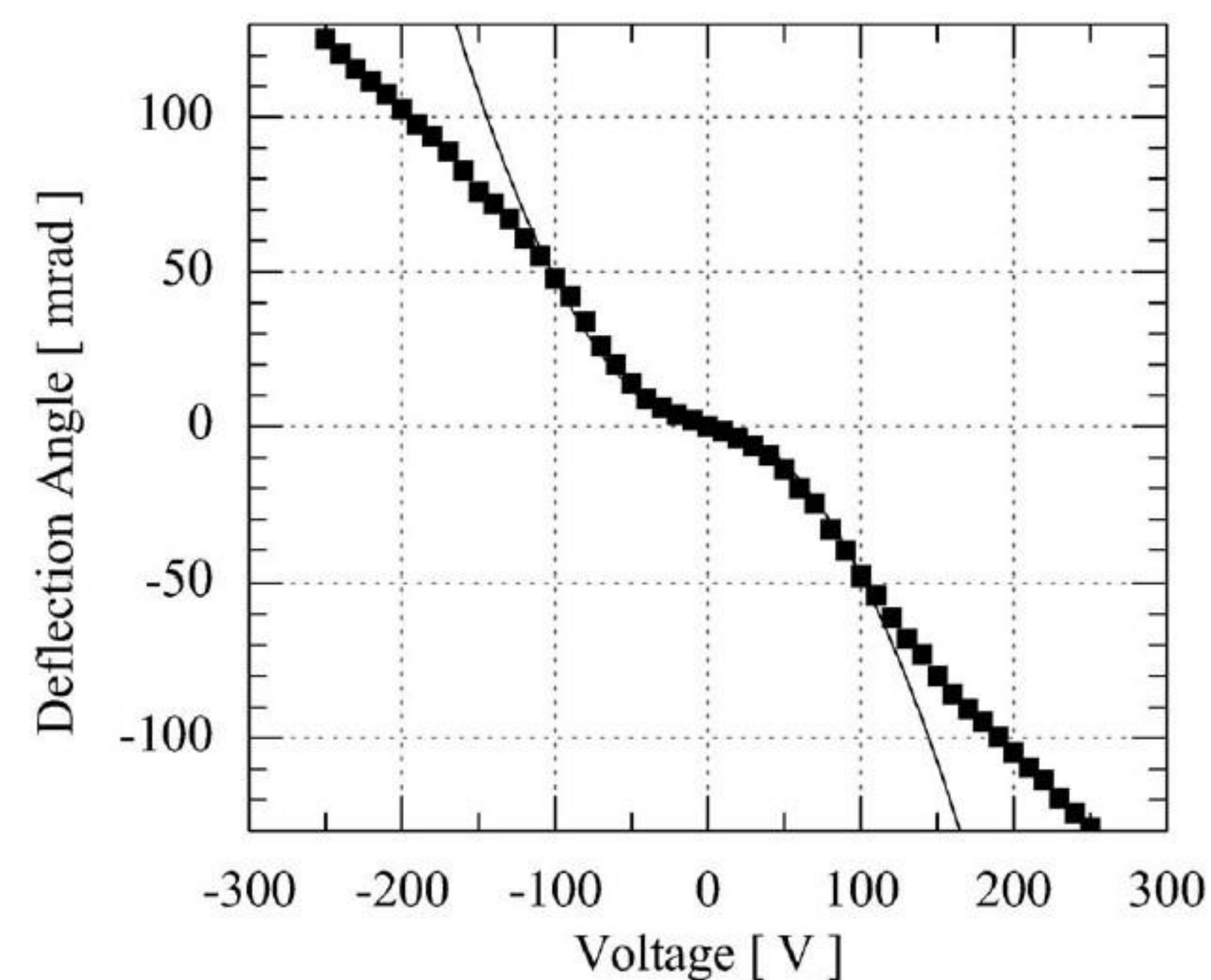
- Kerr effect: second order electro-optical effect.
- Two essential factors: an Ohmic contact and large dielectric constant.
- Linearly graded refractive index induced.
- Optical beam cumulatively deflected.

Methodology

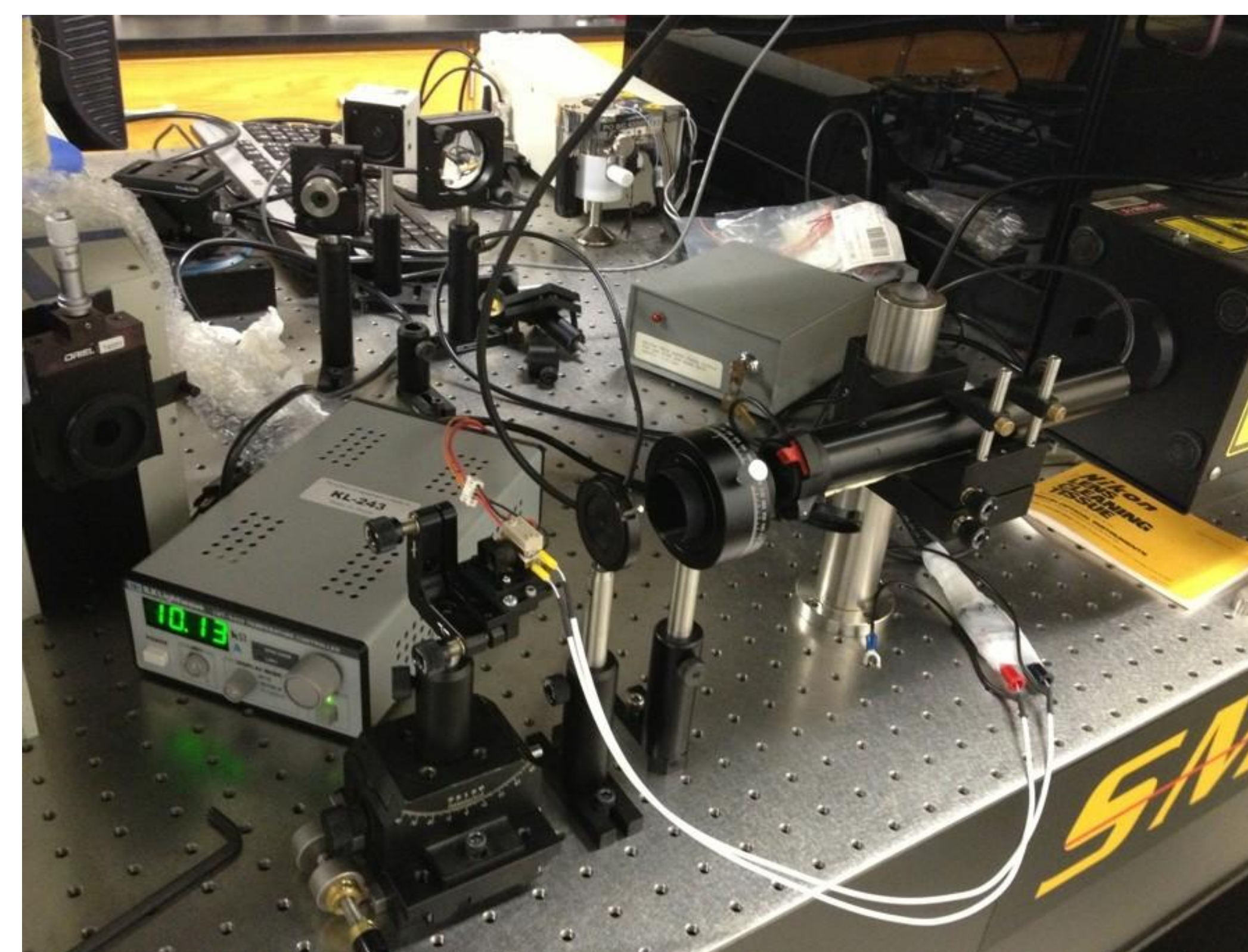
- KTN scanner is set up on a breadboard.
- Applied voltage is provided by a wavefront generator with a high voltage amplifier.
- Temperature controller is required to keep the state of KTN crystal steady .
- Data is collected by CCD.

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.



Deflection angle as a function of applied voltage



Set up of the KTN scanner with temperature controller