

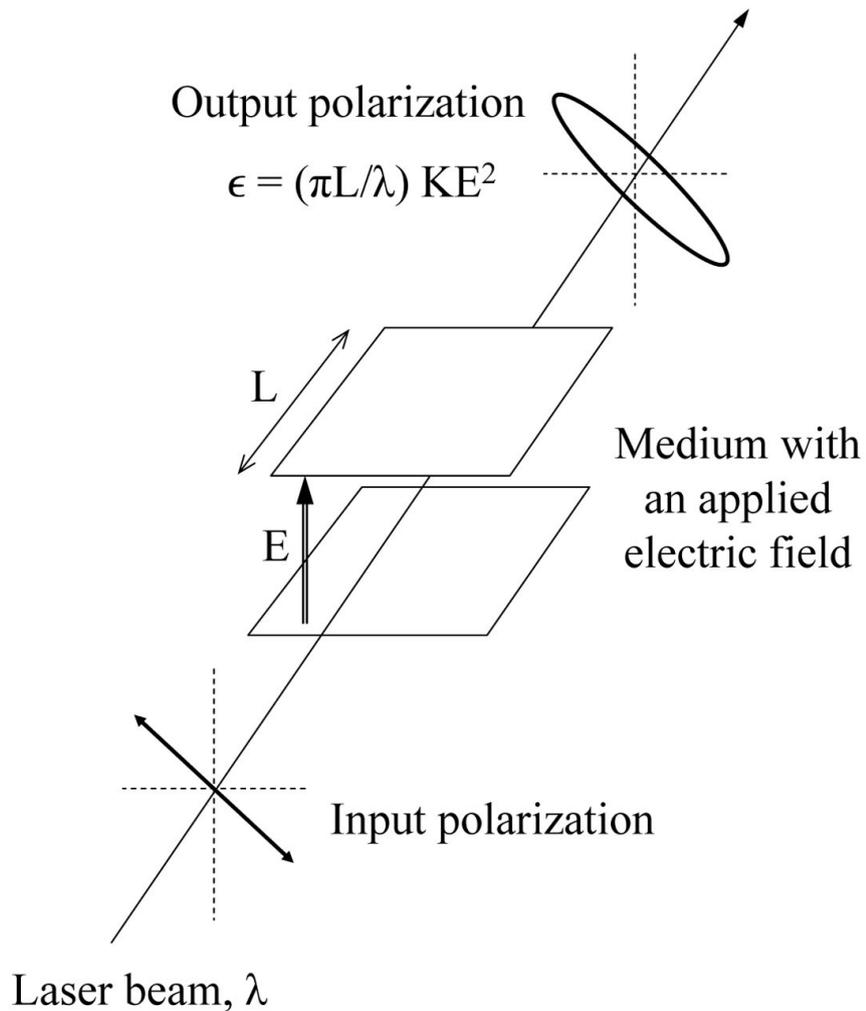
Monitoring E field using Kerr effect in liquid helium

- Kerr effect as a non-contact method of monitoring E field
- Cancelling out the effect from the window

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Kerr Effect

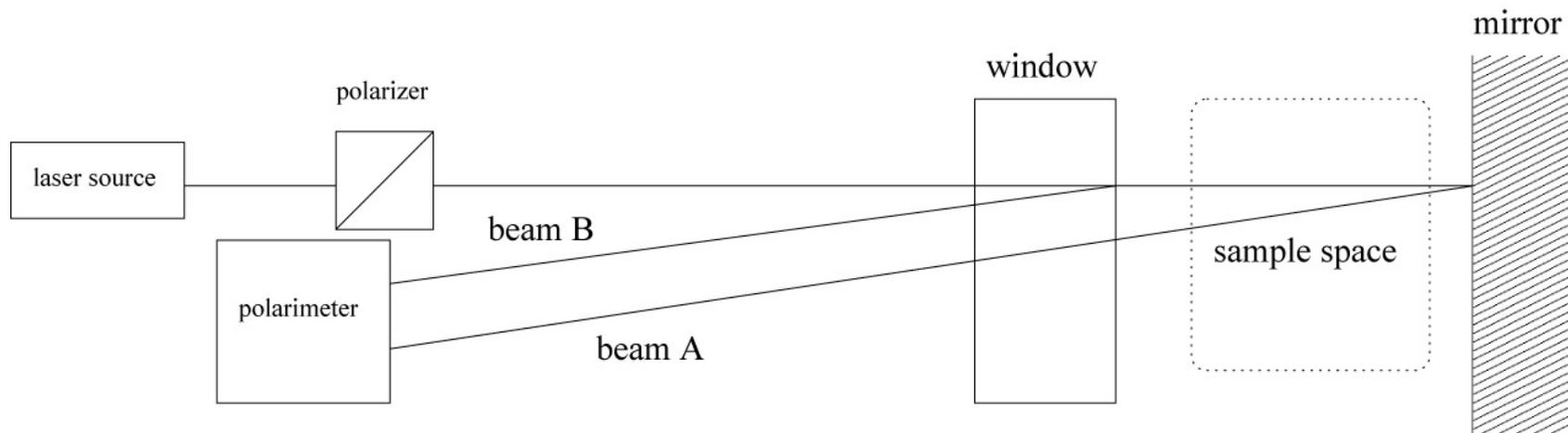


- Electric field in liquid helium creates birefringence in the medium.
- Kerr constant (K) in liquid helium has been measured.
- By monitoring output polarization we can monitor the E field in the medium

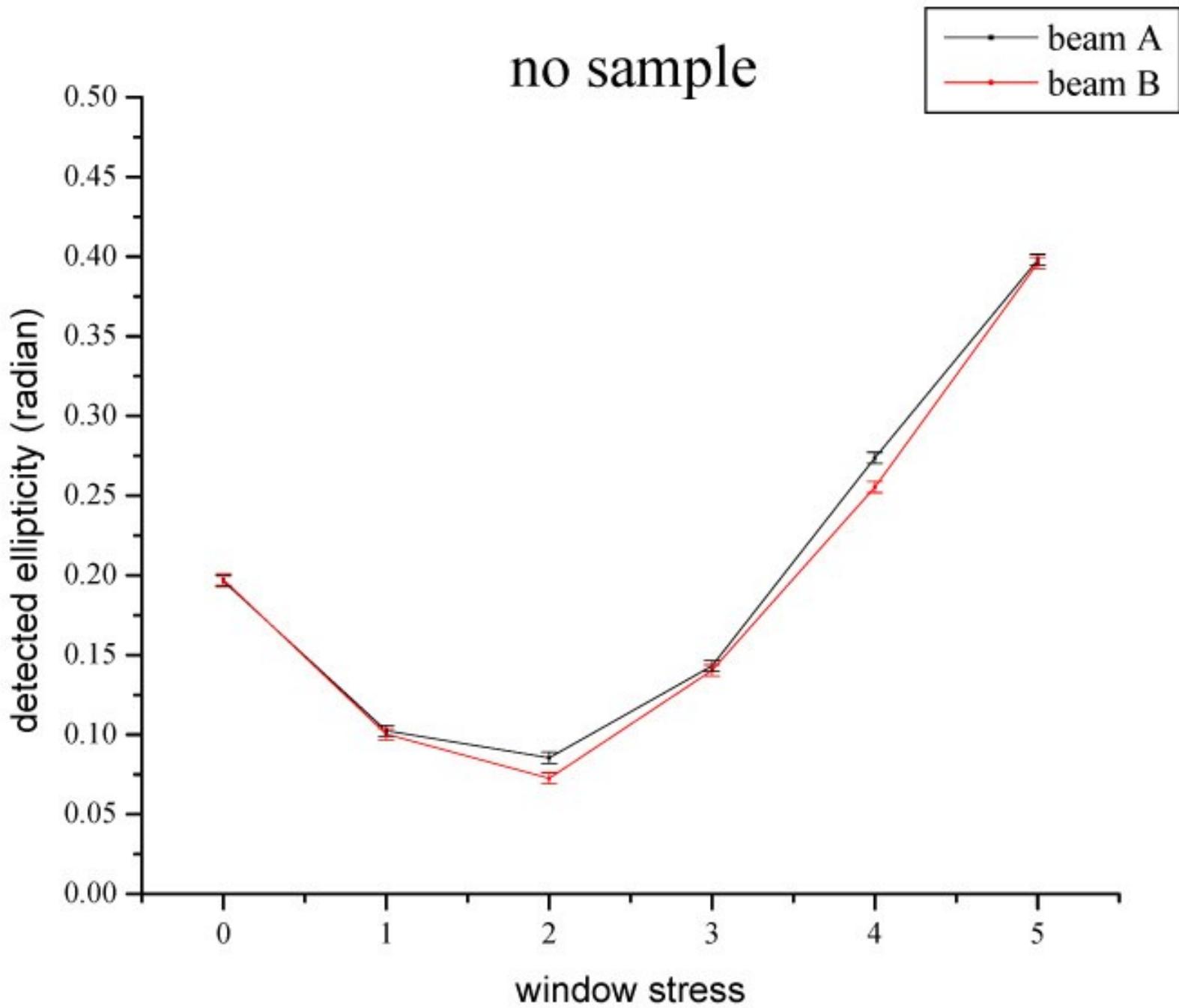
Motivation for the following measurement:

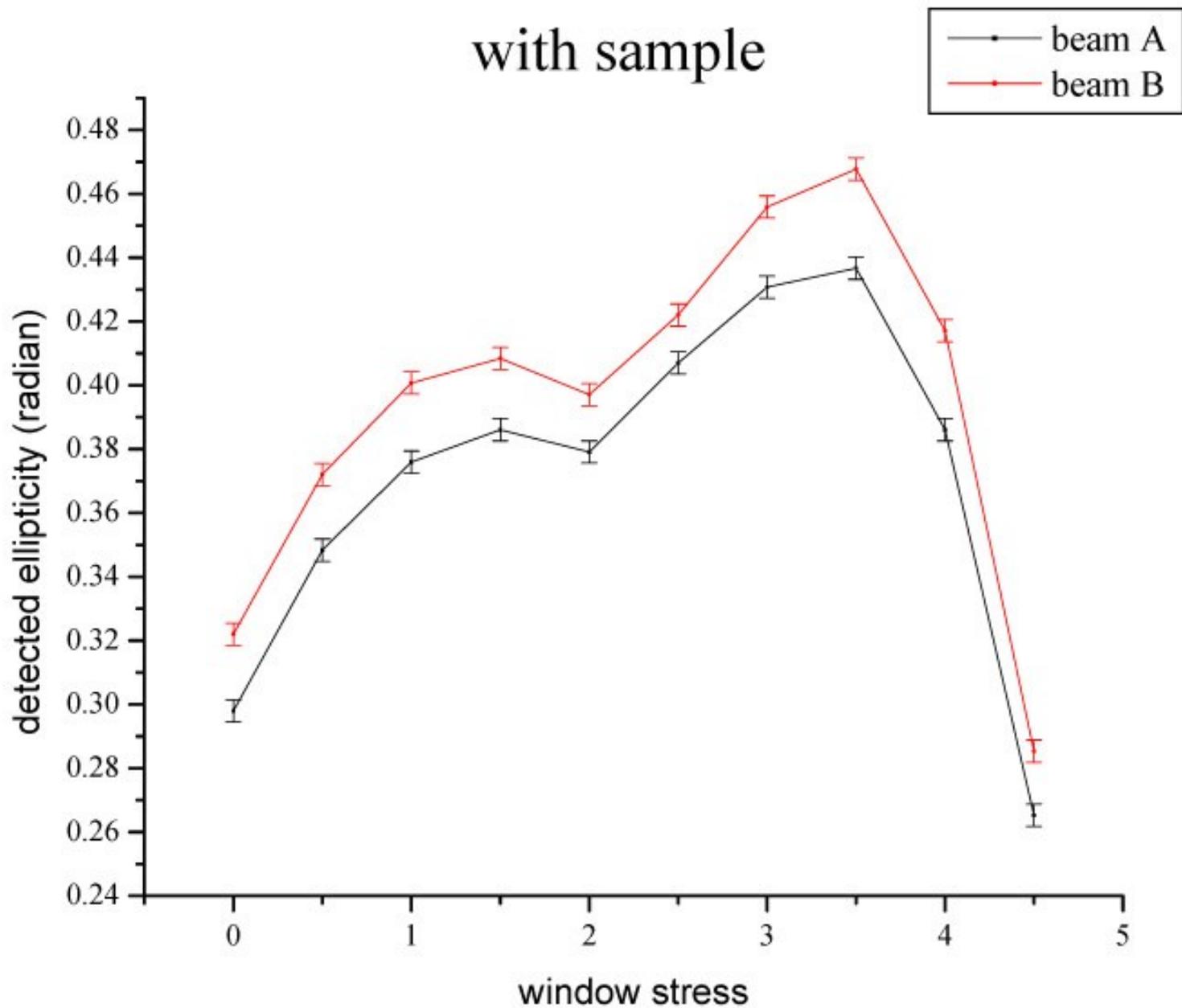
- The cell window becomes birefringent under temperature gradient and stress.
- The ellipticity introduced is about 1 order of magnitude larger than expected in the liquid helium.

schematic diagram



no sample





- Sample birefringence can be measured in a background cell window birefringence greater by at least an order of magnitude.

Next Step

- Obtain or get access to a prototype nEDM cell to reproduce a similar or better result
- Repeat the measurement with a polarimeter set up for real-time measurement
- Try the experiment in a high-voltage setup with liquid helium medium