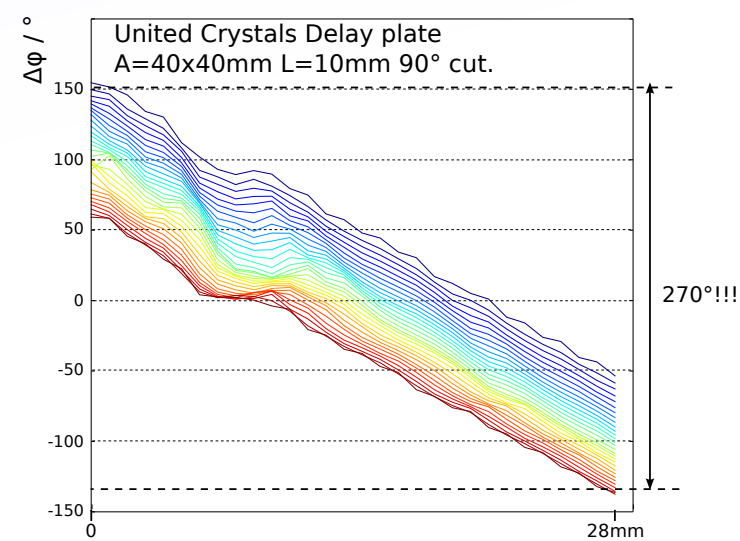
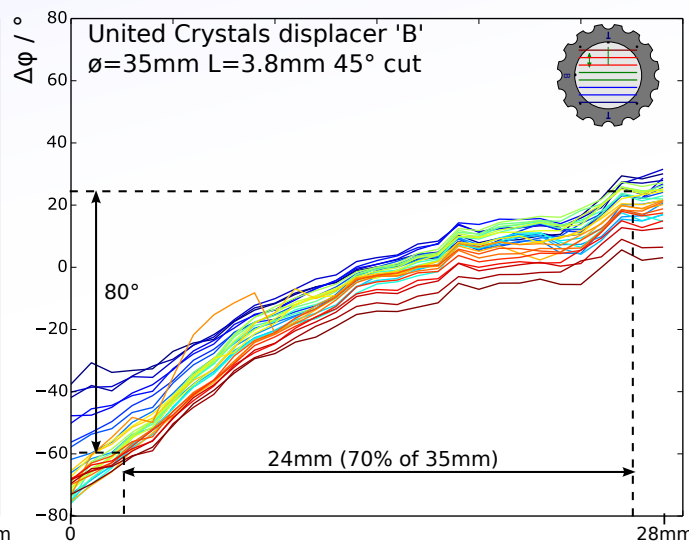
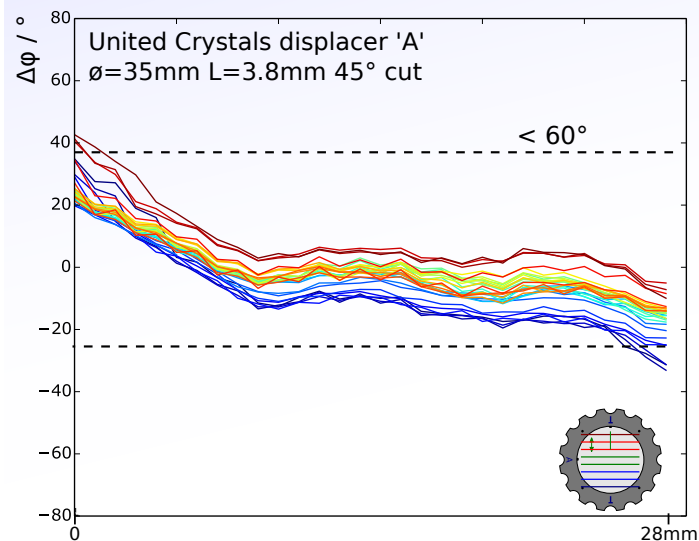
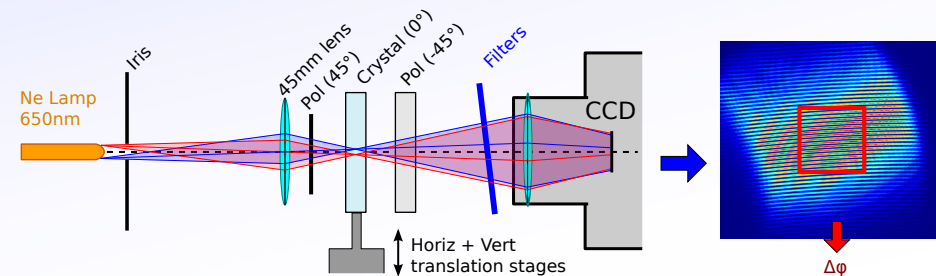


# Birefringence change over surface.

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We measure the birefringent phase difference between ordinary and extraordinary components over a ~2mm area scanned across the surface of the crystal. Measurements are very reproducible. Delay plates (90° cut) are measured with a fixed displacer after the first polariser. Displacer plates (45° cut) are measured alone.



We are not entirely sure what property of the plate causes this. Primary suspects:



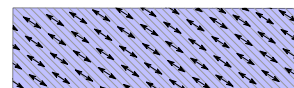
Parallelism

Specs from United Crystals say " $\pm 6$  arcsecs within 70% area". 70% of 35mm is 24mm or would be 29mm for 70% of the 'area' (1225mm<sup>2</sup>). 6 arcsecs over 24mm would give a 0.7 $\mu$ m thickness difference.

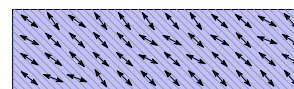
$\Delta\phi = 360 \text{ (no - ne)} \Delta L / \lambda = 45^\circ$   
Plate A is better than this, plate B is 2x worse.  
The 40x40x10mm plate is much worse.

Optic axis Angle:

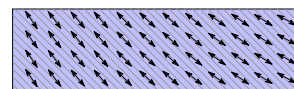
Not specified by United Crystals, but typically  $\pm 0.25^\circ$  elsewhere. What does this mean? I can think of:



a) Crystal cut not aligned with optic axis, but axis is homogeneous: **No problem at all.**



Axis angle varies over small scales randomly but average remains constant: **Not a serious problem.**



Slow variation of axis angle across plate surface: **Really bad - gives surface dependent phase.** 0.2° change would give 2000° of phase variation!