Polarization Conversion in Uniaxial Crystals
When a linearly polarized beam is focused and then propagated through a uniaxial crystal, even when along the optic axis, complicated conversions may take place between different polarization components. Such an effect can be utilized for e.g. generation of optical vortices. Taking calcite crystal as an example, the conversion of polarization in uniaxial crystal is demonstrated in VirtualLab. The optical vortices generated within the process is visualized.
Modeling Task

- **input field**
  - fundamental Gaussian
  - wavelength 633nm
  - diameter (waist) 3mm

- polarizer #1 (x direction)
- lens #1

- calcite crystal
- refractive indices
  - $n_o = 1.6558$
  - $n_e = 1.4852$

- lens #2
- polarizer #2 (x/y direction)

What is the field behind the second polarizer, when it is either along x or y direction?
Experimental measurements from Y. Izdebskaya et al., Opt. Express 17, 18196-18208 (2009)

Physical-optics simulation of complete system includes birefringence and interference effects.
Results

calcite crystal

polarizer #1 (x direction)

polarizer #2

calcite crystal

phase in selected region

squared amplitude

polarizer #2 in x direction

squared amplitude

polarizer #2 in y direction
# Document Information

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