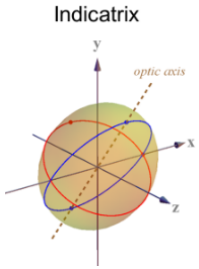
Distance Learning Fall 2013

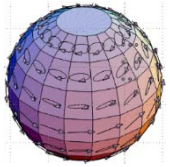
College of Optical Sciences
The University of Arizona



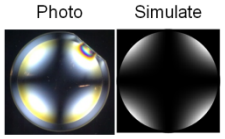
Polarization in Optical Design
OPTI 586 (3 units)

Russell Chipman
College of Optical Sciences

Monday & Wednesday 8:00-9:15

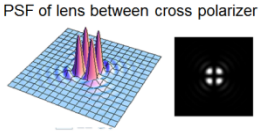


OPTI 586L (1 unit)
Polarization in Optical Design Laboratory



Greg Smith

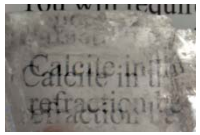
Monday 9:30-10:20

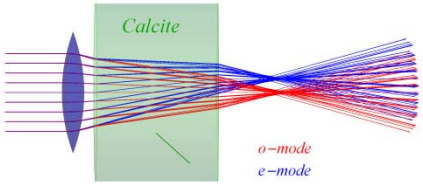


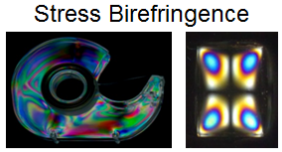
Available as a Distance Learning Course

www.optics.arizona.edu/distance/Fall2013.html

This course has recently been developed for students and optical engineers who need to apply polarization concepts to optical systems.



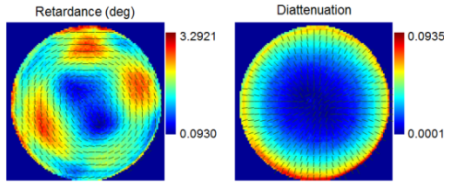




Course Description:

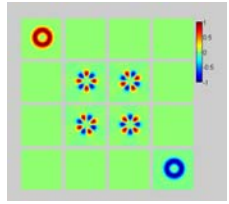
This class explores cutting edge optical design algorithms on a variety of imaging systems, display systems, complex prism and crystal components, diffraction gratings, and liquid crystal display models You will learn the secrets of polarization dependent aberrations.

Lens polarization aberrations



Gain skill to:

- Follow polarization changes along ray paths through optical systems.
- Understand differences between ideal polarizers and retarders and real world components
- Interpret polarization aberrations.
- Develop polarization specifications for optical systems



Mueller matrix PSF

Subjects Highlight:

- Jones, Mueller, and Polarization Ray Tracing calculus
- Polarization ray tracing with new Polaris-M program
- Polarization aberrations and their effect on the Point Spread Function and Modulation Transfer Function
- Polarization from coatings, anisotropic materials, liquid crystals, and stress birefringence

Polarization Laboratory Case Studies:

- Lens and telescope mirror polarization
- Beamsplitter and high reflection coatings
- Angular dependence of retarders, crystal and wire grid polarizers
- Multi-order retarder spectra
- Biaxial multilayer structures and liquid crystal cells
- Simulation of polarization dependent Point Spread Functions (PSF) and Modulation Transfer Functions (MTF).

There is high demand for optical designers with skill in polarization design and analysis. These skills are highly valued in markets such as microlithography, computational imaging optics, liquid crystal displays, and so on.

Mathematica is used extensively, but students do not need to be proficient at the beginning of the term. Mathematica skills are developed in the lab class with students working in small teams.

Prerequisite: A course in Electromagnetic Waves such as OPTI 501