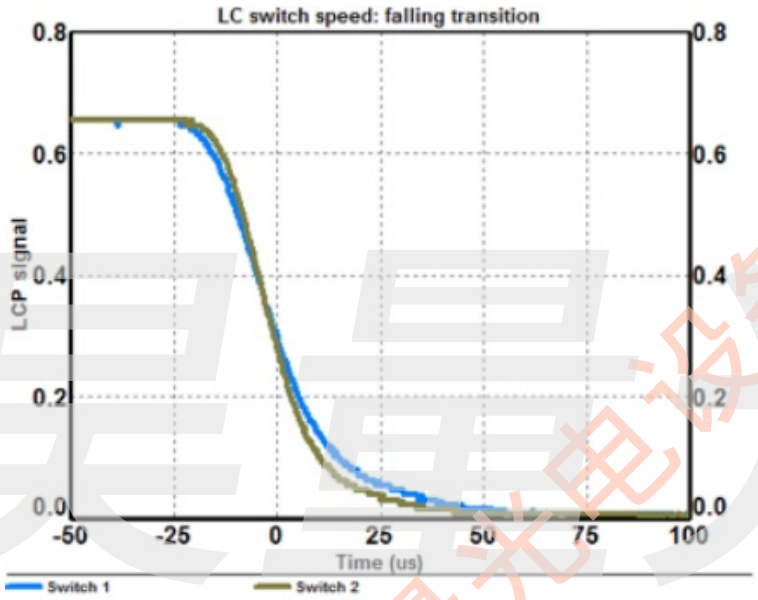
meadowlark optics

Liquid Crystal Polarization Grating Lenses

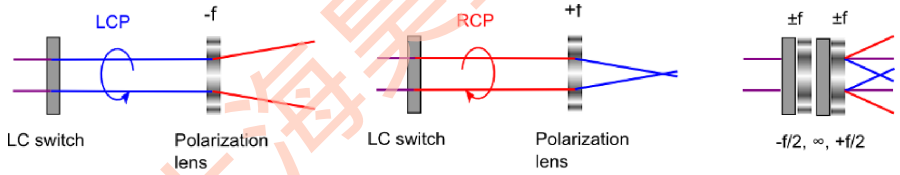
Fast • Non-mechanical • Remote Focusing

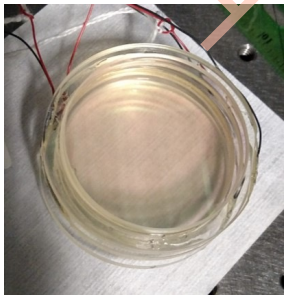
Liquid Crystal Polarization Gratings utilize spatially varying birefringence to create highly efficient polarization-sensitive gratings. Circularly polarized light will see a positive or negative lens depending on the handedness of the incident light. By using an alternating stack of LCPGs and half-waveplate switches, we can produce large discrete focus changes in <40 µs.

Fast, Discrete Refocusing (>500 µm in < 40 µs)

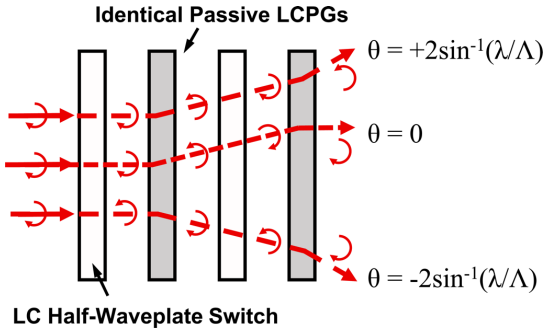


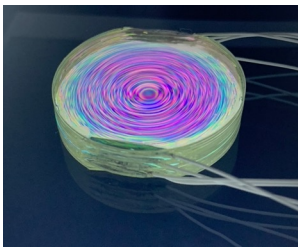
Stackable for access to many focal planes





LCPG Lens Stack Schematic





Benefits of LCPG Lens Remote Focusing

- Low size, weight, and power
- <40 µs fast direction
- <3 ms slow direction
- Robust non-mechanical operation
- Large apertures possible (>5 cm)
- High diffraction efficiency (>99%)
- Simple microscope integration
- Demonstrated in VIS to MWIR
- Broadband systems possible

Liquid Crystal Suite

Variable Retarders
Liquid Crystal Variable Retarder
UV Variable Retarder
MWIR Variable Retarder
OEM LCVR

Rotators
Achromatic High-Speed Rotator
Binary Rotator
Polarization Rotator

Shutters / Attenuators
Achromatic High-Speed Shutter
High Contrast Shutter
Variable Attenuator

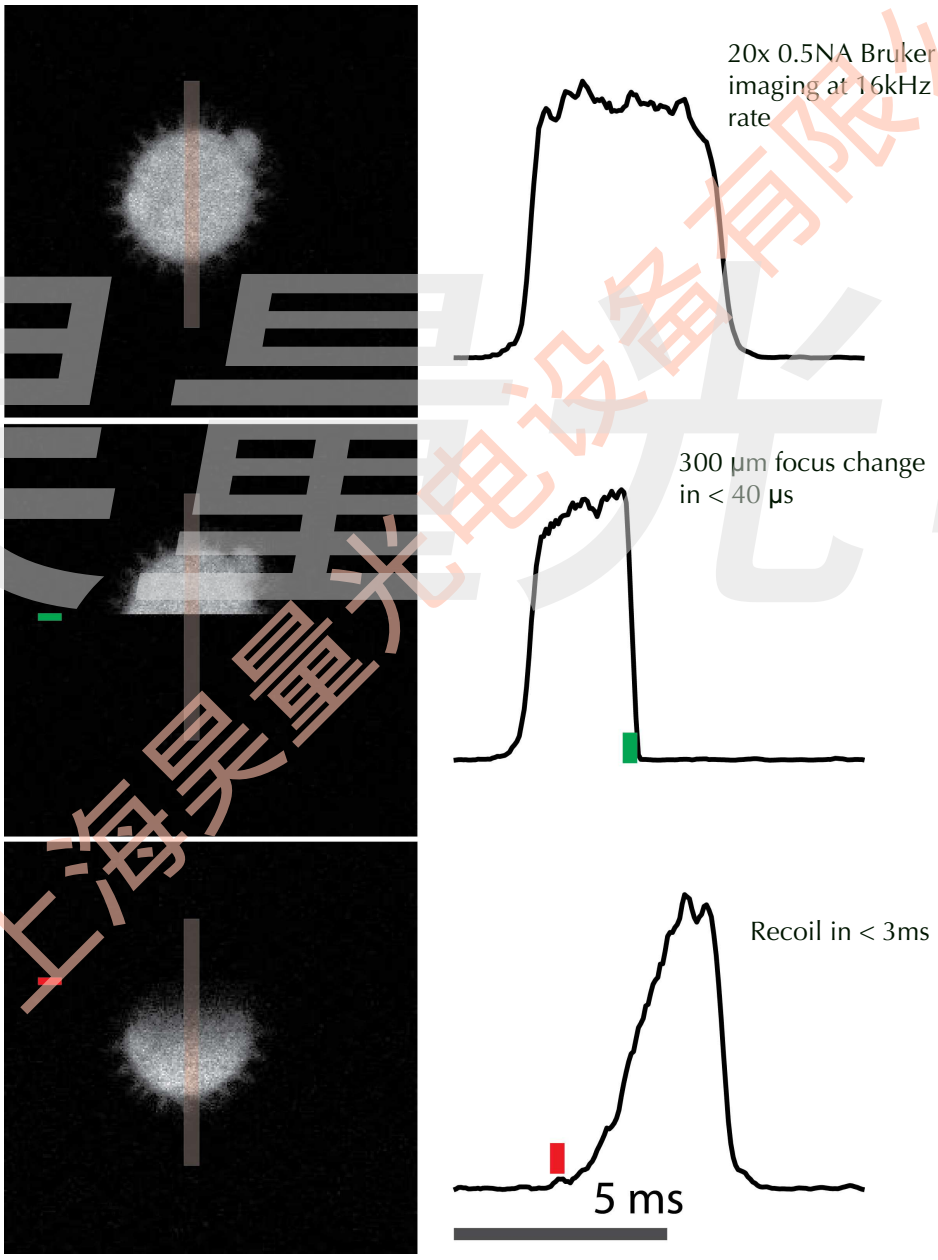
Controllers
Analog Controller
FLC Controller
LC Digital Interface Controller
Temperature Controller
Two Channel High Voltage Controller

ORDERING INFORMATION

Meadowlark can provide custom systems to meet your needs using the patented liquid crystal polarization grating (LCPG) beam steering technology. When contacting us for a quote, please provide:

- Nominal Focal Lengths and/or Focal Plane Shifts (mm)
- Tolerance Requirements
- Response Time (ms)
- Wavelength (nm)
- Diameter (mm)
- Description of Application & Additional Details

Remote focusing in a two-photon microscope



2P microscope images courtesy of Darcy Peterka, Columbia University

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