

## BARR INTERFERENCE FILTERS FOR NEAR INFRARED (NIR) AND SHORT-WAVE INFRARED (SWIR) APPLICATIONS



### Overview:

Barr designs and manufactures optical interference filters for use over the broad spectral range which spans 200nm in the ultraviolet through 50 microns in Far Infrared. Included is capability to produce optical filters and coatings for use in the Near Infrared (NIR), 0.7 micron to 1.4 micron, and in the Short-Wave Infrared (SWIR), 1.4 micron to 3.0 micron. Barr's extensive library of manufacturing plans for NIR and SWIR optical coatings/filters can be deployed, tailored, or new ones developed to meet your specific thin film coating need; whether it be for a high volume application or for a "one-of-a-kind" coated optic.

### Representative NIR and SWIR Filter applications

- Optical Communications (Laser-Com) & Telecommunications
- Thermal Imaging
- Night Vision
- Thermography
- Filtering of IR Detectors including Detector Arrays used in:
  - Process control
  - Machine vision
  - Imaging
  - NDIR Spectroscopy
  - Gas analyzers
- Remote Temperature Sensing
- Meteorology
- Target Acquisition
- Tracking
- Surveillance
- Infrared LIDAR
- Astronomy- Bandpass Filters for J,H, K-band Atmospheric Windows

## Barr NIR and SWIR Interference Filters and Coatings

### Filter Types

- Bandpass (Ultra-Narrowband and Wideband, Multi-Band)
- Edge (Longpass and Shortpass)
- Notch
- High Reflector
- Beamsplitter
- Neutral Density
- Antireflection

### Filter Configurations

- Different Sizes and Shapes
- Unmounted or Ring-mounted
- Thin filter thickness available
- Single substrate and multi-component
- Filter Arrays
- Patterned Filters
- Metalized

### Spectral Design Range

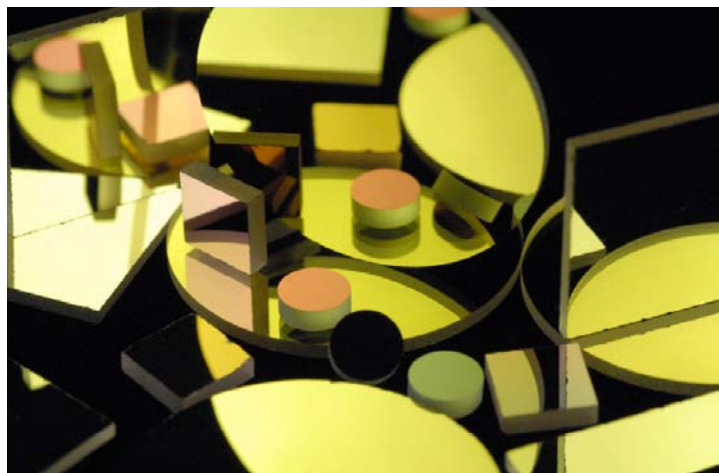
- 750nm to 3000nm

### Blocking

- Deep out-of-band blocking for common detectors including Si photodiode, InGaAs, InAs, PbS, InSb, PbSe, and MCT

### Environmental Durability Characteristics

- Robust environmental durability characteristics to MIL-Stds.



## Examples of Available Special Features or Characteristics:

### Bandpass

- Ultra-narrowband (FWHM < 0.1% of CWL)
- Wideband
- Multi-band
- Square or Gaussian passband shape
- High T%, Flat transmission in passband
- Deep blocking (> OD6) near passband
- Deep blocking over extended wavelength range
- Reduced Angle Shift
- Design for normal or non-normal AOI
- Low Temperature Coefficient
- Image Quality available

### Longpass and Shortpass

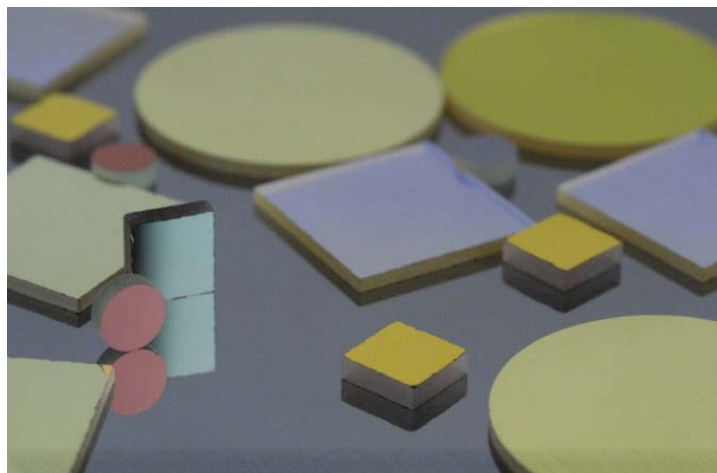
- Steep Slope
- Extended Transmission Range
- High T% and Low Ripple in Transmission Passband
- Extended Wavelength Range for Blocking or Reflection
- Deep blocking or high reflectance in reflection band
- Design for normal or non-normal AOI

### Notch

- Single Line or Multi-line
- Rugate notch available for extended transmission range without harmonics
- High R% or deep blocking within notch

### Beamsplitter

- Designs with low polarization splitting available
- Extended Transmission and Reflection ranges

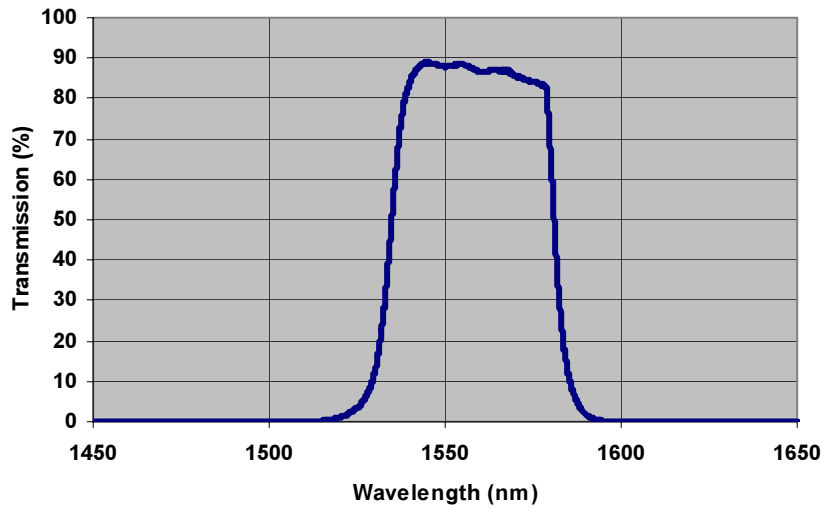


## Representative Filter Spectra (measured data):

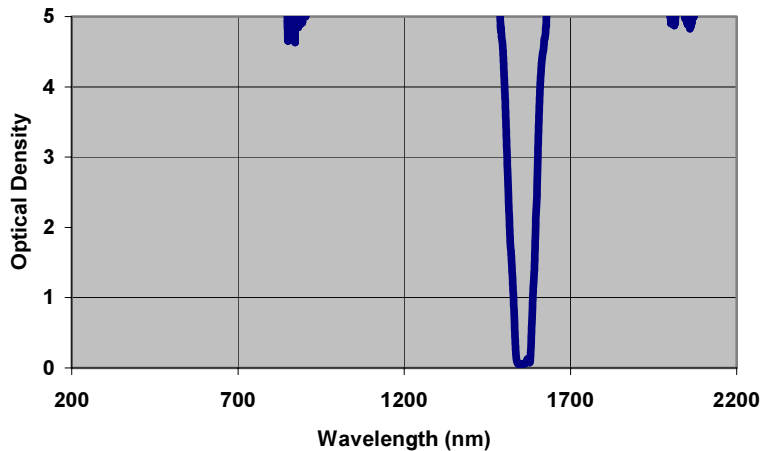
(The following spectral curves serve to illustrate measured spectral performance associated with selected filter types Barr has designed and produced within the NIR and SWIR spectral regions. However, this collection of spectral curves does not reflect Barr's total capabilities to produce NIR/SWIR optical filters. Since Barr's core business is the design and manufacture of optical filters and coatings to customer specifications, we are equipped to offer optical filters & coatings designed to meet your specific needs.)

### BANDPASS

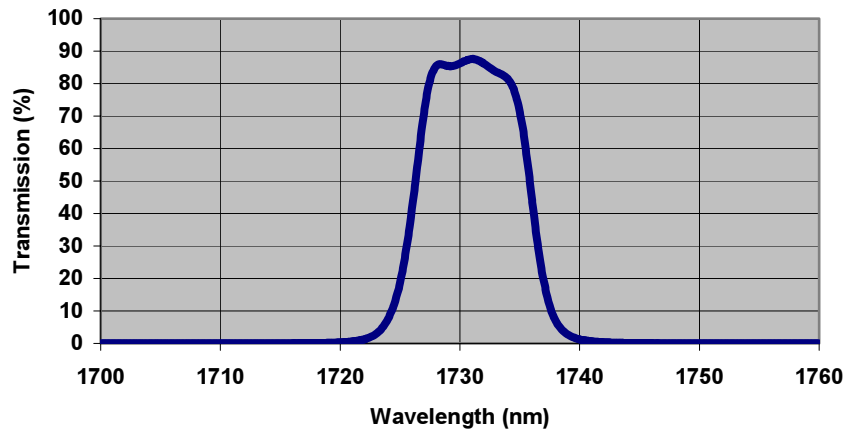
1555nm Bandpass, with wide blocking range



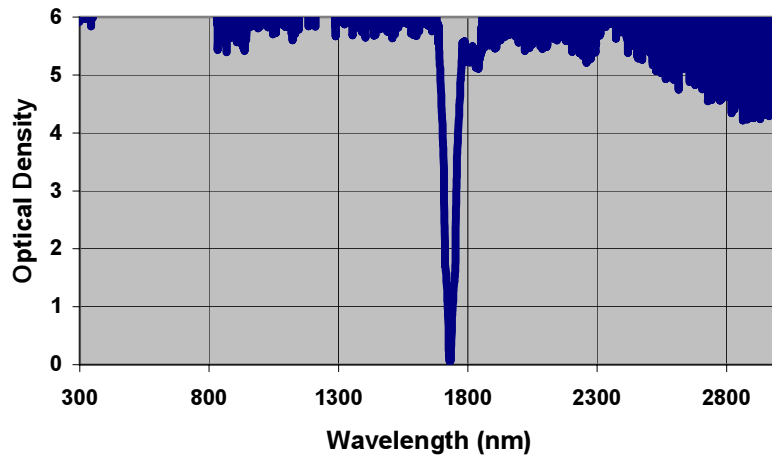
1555nm Bandpass - wide blocking range



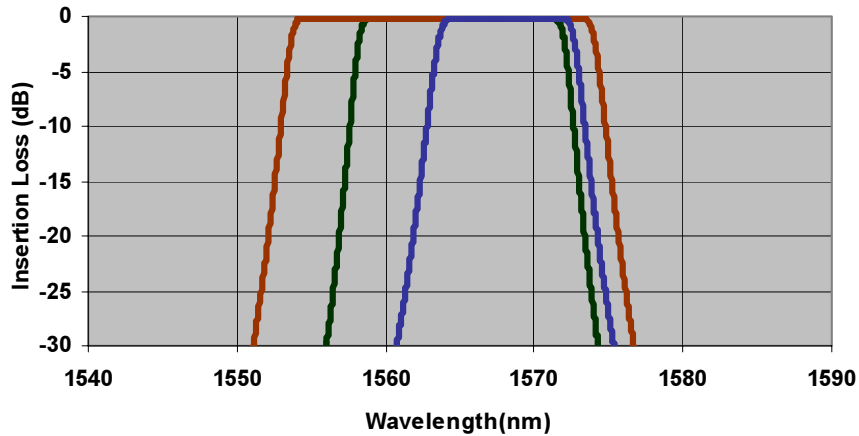
1730nm Bandpass Filter with wide blocking range



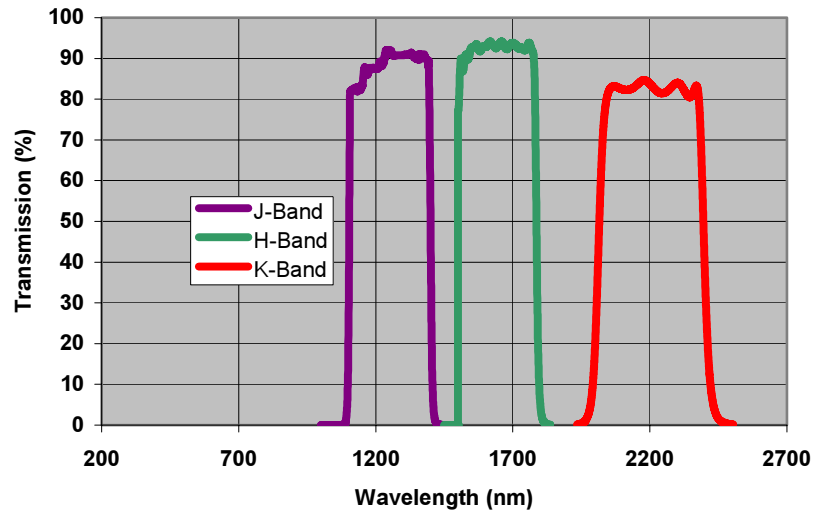
1730nm Bandpass Filter - Wide-Range Blocking



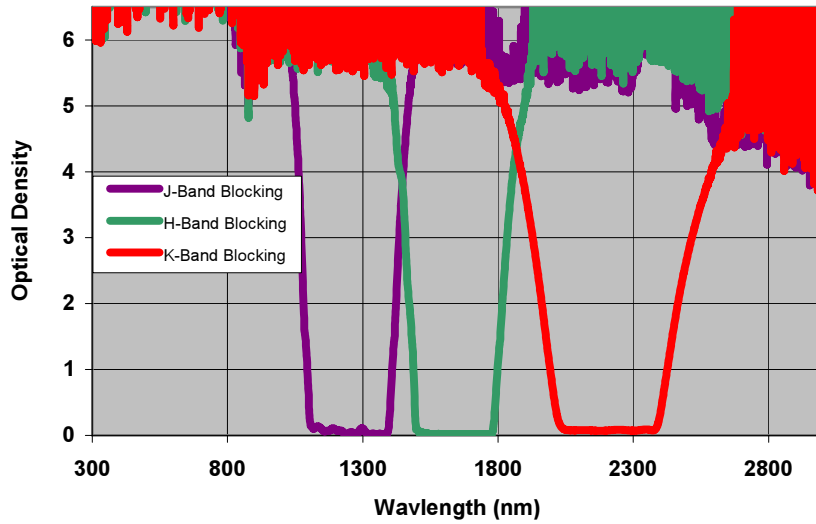
Three separate Bandpass Filters for LaserCom Application



### J-, H-, and K- Band Filters for Astronomy

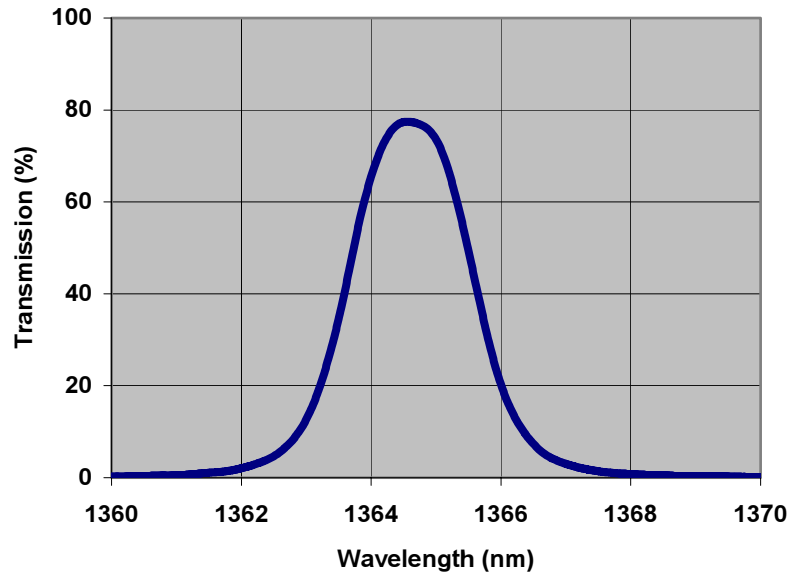


### J-, H-, K- Bands- Blocking

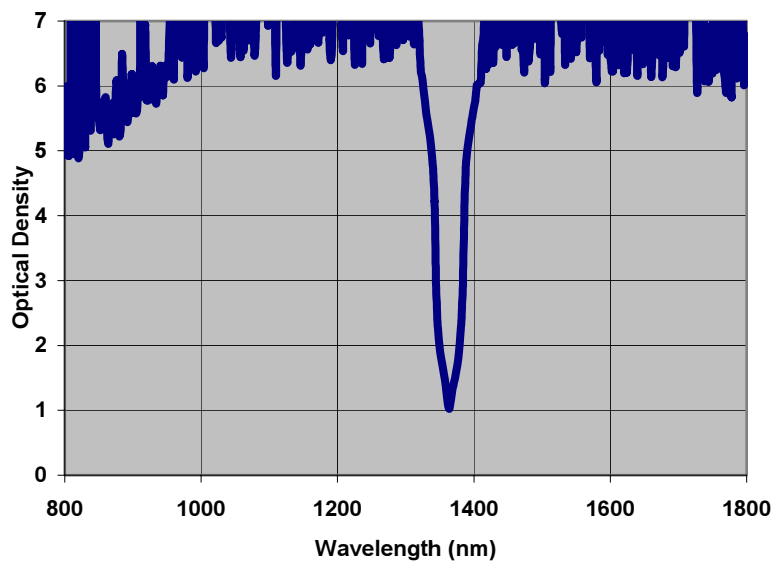


## NARROW BANDPASS

1364.6nm / 2.0nm Bandpass Filter, Blocked for InGaAs Detector

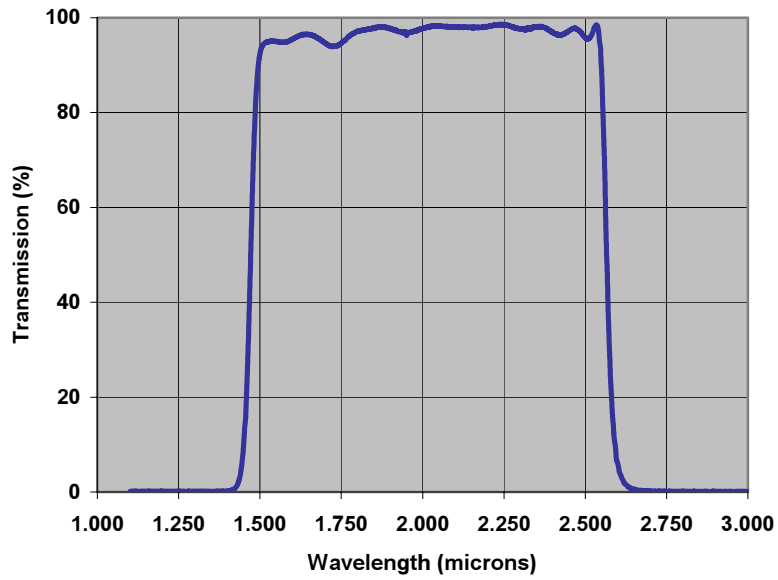


1364.6nm Bandpass Filter - Blocking



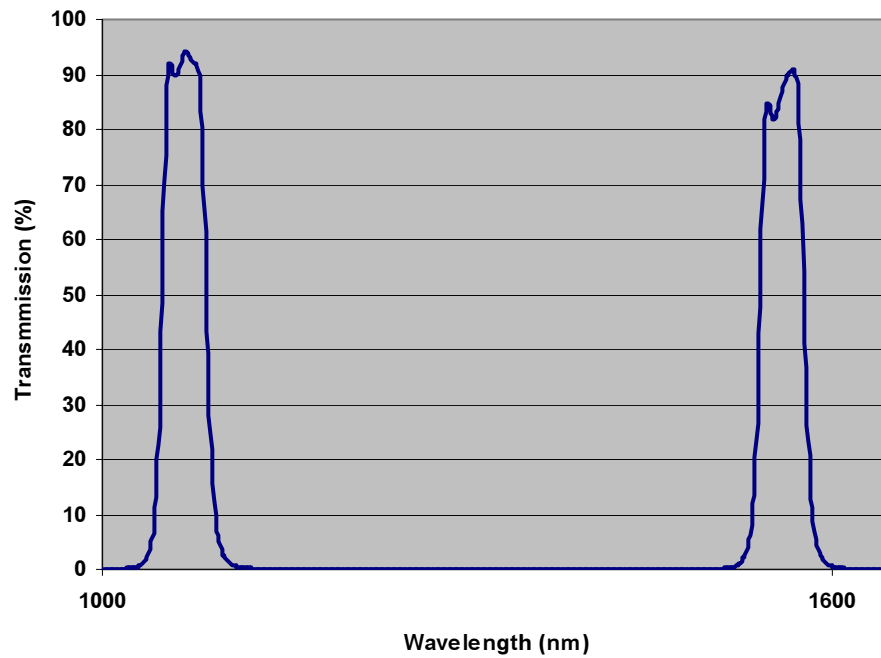
## WIDEBAND

Wideband Filter , 1.5 to 2.6 microns



## MULTIBAND

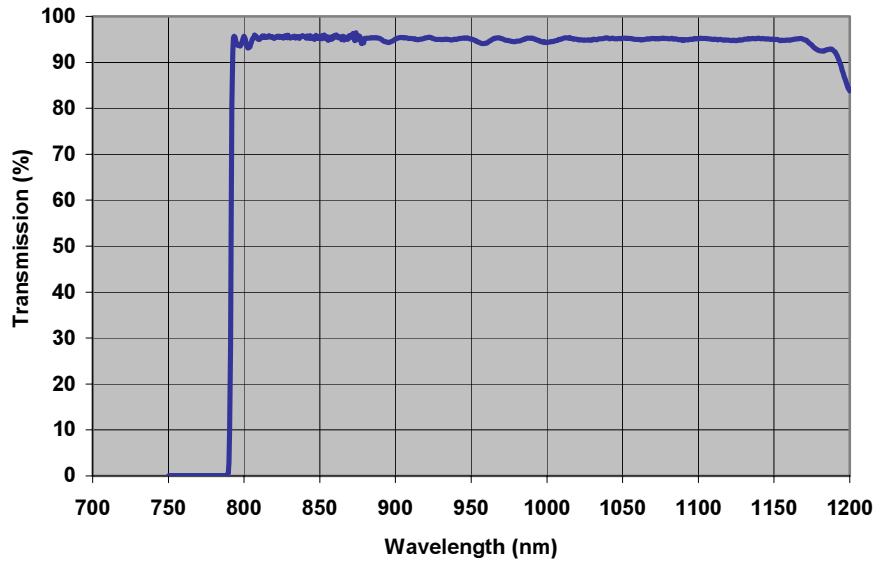
NIR Dual Bandpass Filter blocked for InGaAs detector



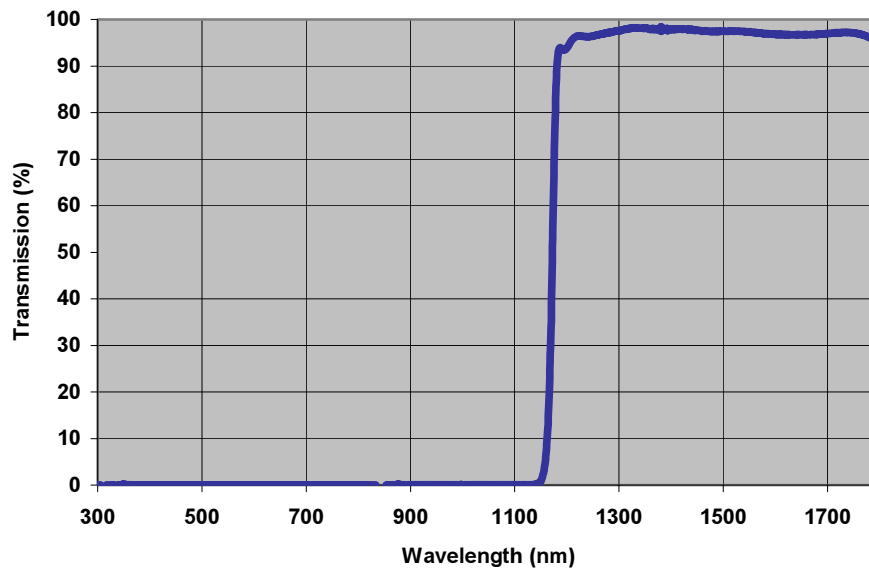


## LONGPASS

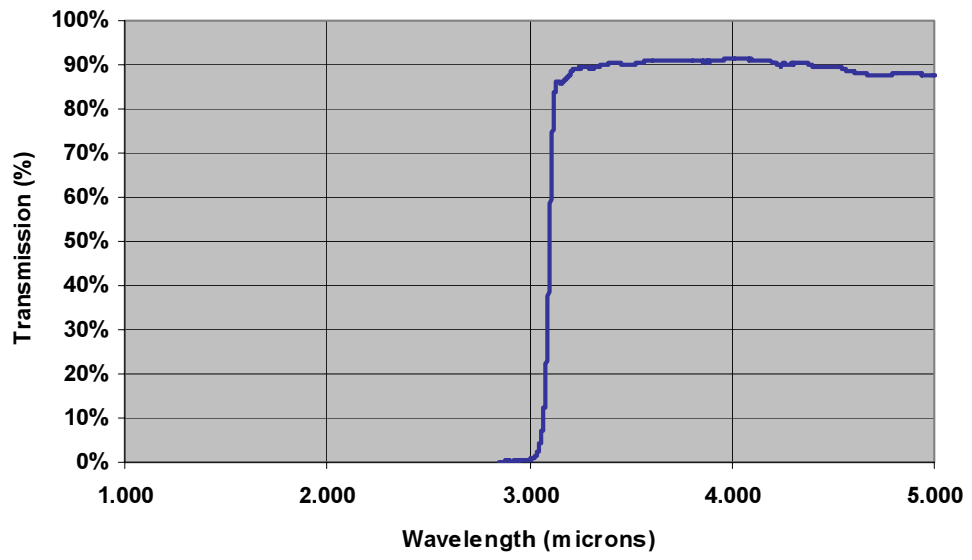
### 785nm Steep-Edge Laser Rejection Filter



### NIR Longpass Filter, blocked to 300nm

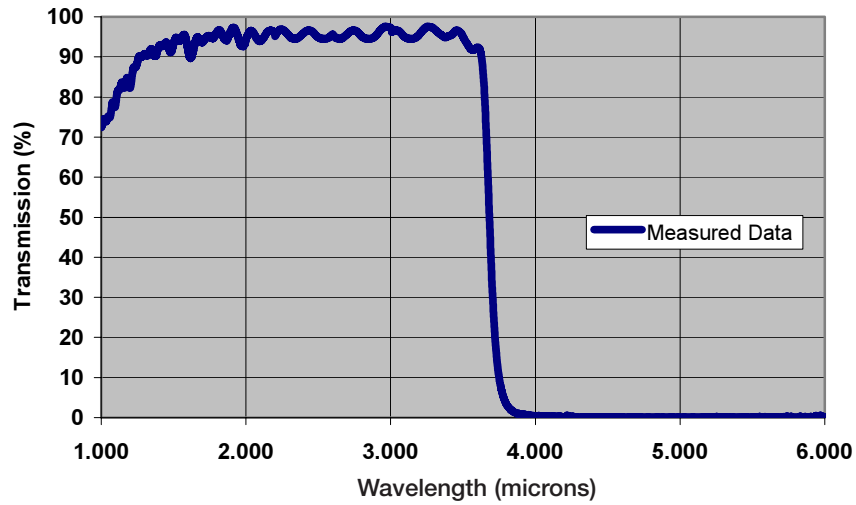


Longpass Coating (3.1 micron) on Silicon



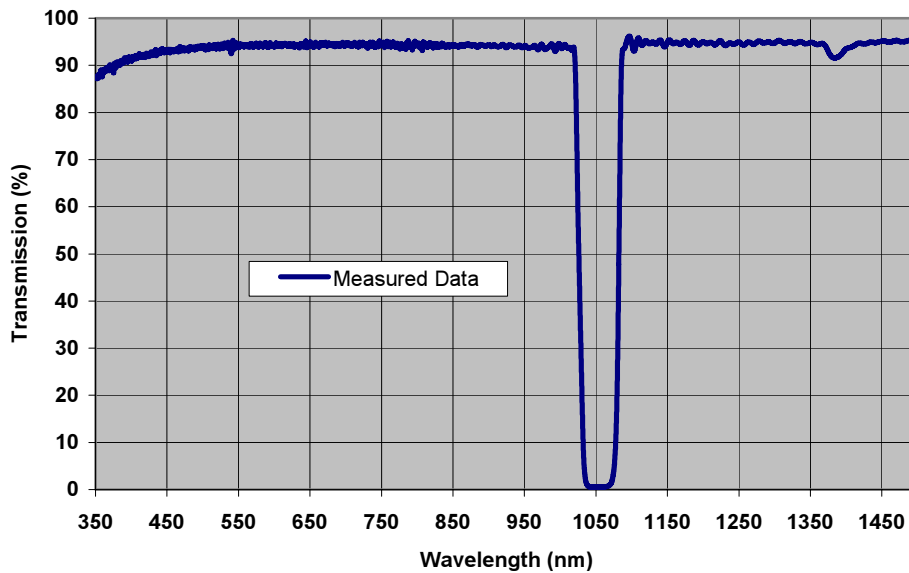
## SHORTPASS

Shortpass Coating (3.7 micron) on Silicon



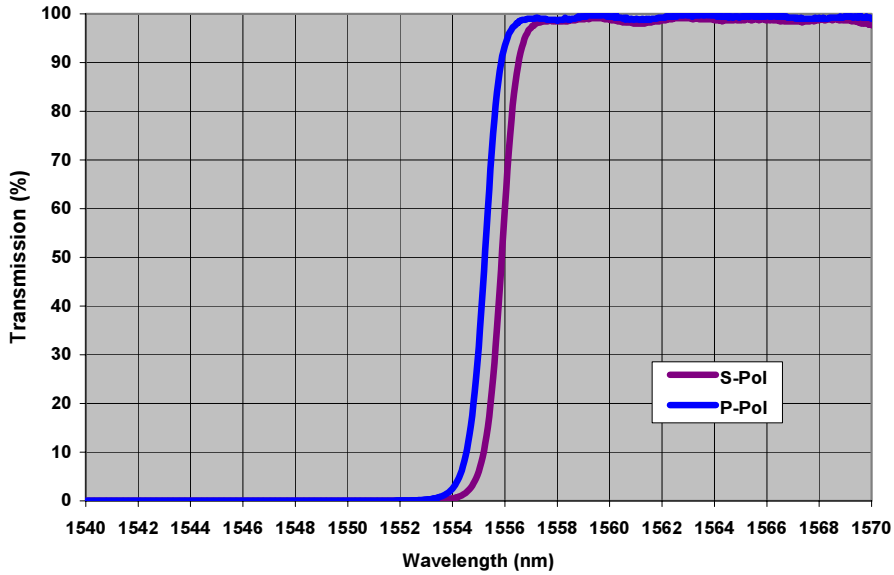
## NOTCH

Rugate Notch Filter at 1064nm with high transmission through visible and NIR spectral regions

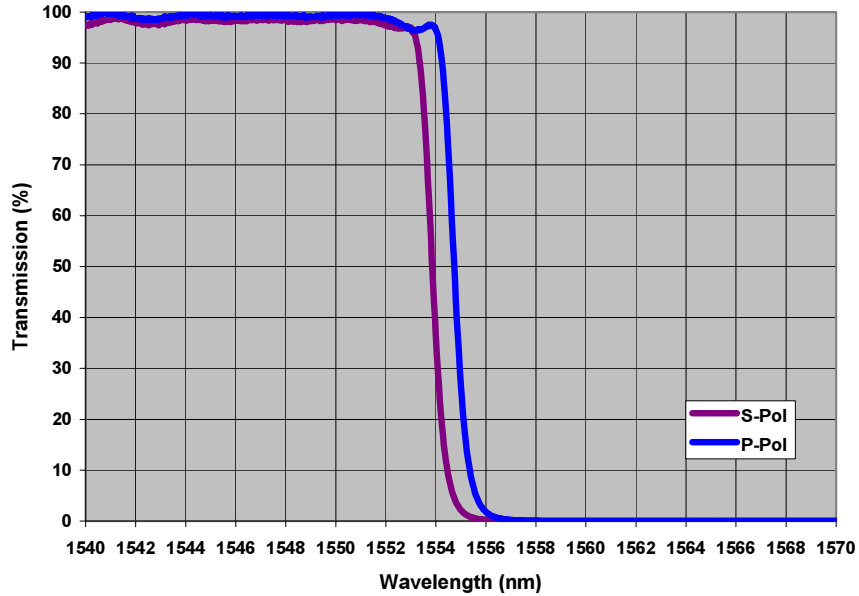


## BEAMSPLITTER

Longpass Beamsplitter @ 15 deg AOI, for LaserCom Application,  
2 inch diameter



Shortpass Beamsplitter @ 15 deg AOI, for LaserCom Application,  
2 inch diameter



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