

ASE Suppression Filters

Ondax's NoiseBlock™ ASE (Amplified Spontaneous Emission) filters suppress the broad spectrum of spontaneous emission that commonly occurs in laser diodes to provide a pure, ASE free, single frequency laser.

Adding a NoiseBlock™ ASE filter to a single frequency wavelength stabilized laser effectively reduces broadband spectral ASE background to more than 70dB below the laser line while transmitting 90% of the single frequency line (see graph on next page).

The filter's narrow spectral profile (HWHM $<10\text{cm}^{-1}$) is designed to match the SureBlock™ ultra-narrow-band notch filter, making it ideal for enabling ultra-low frequency Raman spectroscopy with high signal-to-noise.

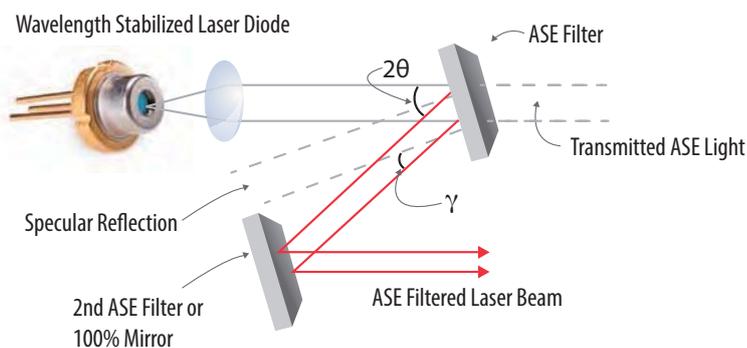
Specifications:

Parameter	Minimum	Typical	Unit
Center Wavelength	405	405, 532, 640, 658, 685, 690, 780.25, 785, 808, 830, 976, 1064, 1550	nm
Bandwidth ¹	0.03	<0.15 <10	nm (FWHM) cm^{-1} (HWHM)
Diffraction Efficiency		>90 (>70 for 405nm)	%
Temperature Dependence		0.01	nm/ °C
Total Deflection Angle (2θ)		8 - 12	Degrees
Inter-beam Angle (γ)		2	Degrees
Clear Aperture Diameter	4.5mm in $\frac{1}{2}$ " mount. Custom sizes available		

¹ Grating bandwidth is a function of wavelength and thickness

Principle of Operation

NoiseBlock™ ASE filters are designed to transmit ASE emission from a wavelength stabilized laser and reflect only the desired single frequency line. The inter-beam angle is chosen to separate the diffracted beam and the residual surface reflections, resulting in a clean, ASE-free output.



Free Space or Fiber Pigtailed

Features:

- High transmittance at design wavelength
- Reduce typical broadband ASE levels to more than 70dB below the laser line
- Narrow spectral bandwidth
- Customizable slant angle for angular separation of beams
- No degradation under high power illumination conditions
- Environmentally stable at high temperature and humidity with over 12,000 hours of testing at 150°C
- Fiber coupled input/output available at select wavelengths

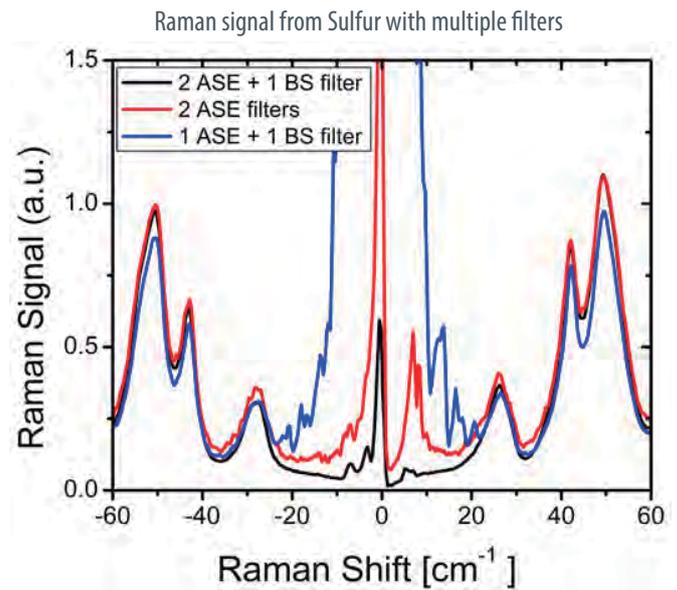
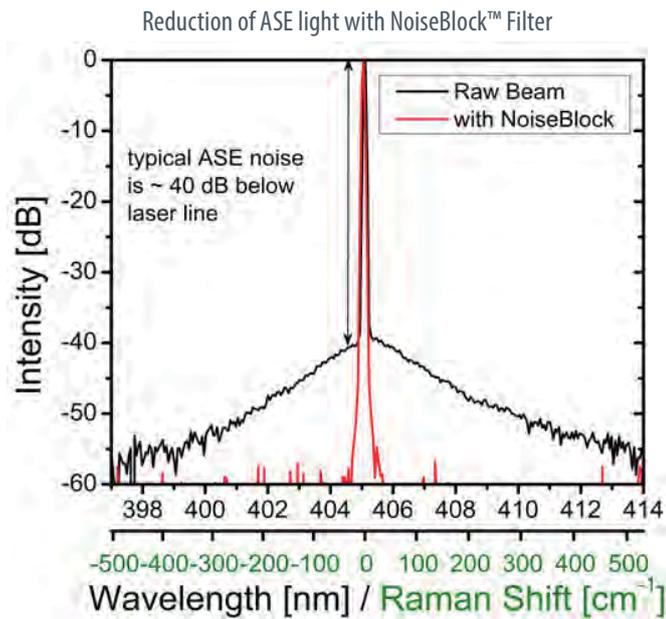
Applications:

- Removal of broadband ASE, fluorescence, and unwanted laser line emission
- ASE noise reduction for Raman spectroscopy

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Principle of Operation

Adding a single NoiseBlock™ ASE filter (see left image below) eliminates almost all ASE light from the emission of an Ondax SureLock 785nm single frequency laser diode and enables diode lasers to be used as substitutes for gas lasers in many applications.



For applications such as low frequency Raman spectroscopy that require extreme attenuation, filtering of the residual ASE near the laser line must be >70dB below the excitation laser line for high signal-to-noise. In these cases, combining two ASE filters with a spectrally matched 90/10 beamsplitter (BS) filter, enables optimum alignment of SureBlock™ ultra narrow-band notch filters for maximum Rayleigh light suppression with high throughput to within 10cm⁻¹ of the laser line.

The above image on the right shows the effect of adding one or two ASE filters on the measured sulfur spectrum from a low frequency Raman system at 785nm. A single ASE filter and beamsplitter still shows residual ASE out to 20cm⁻¹.

Ordering Information

ASE- $\lambda\lambda.\lambda$ - AA

λ : Wavelength¹ (nm)

A: Package Style²

¹ Specified in vacuum to 0.1nm accuracy required for non-gas lines

² FS = Standard 1/2" round mount, FP = Fiber pigtailed (available for standard telecom wavelengths)



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