3.5.4 Beam Expanders Microscope Objectives

Model	Beam Expander	4X Beam Expander with UV Converter
Wavelengths	4X : 340-1800nm 6X, 12X, 22X: 530-1100nm	193nm-360nm
Beam Size Change	4X, 6X, 12X, 22X	4X Expansion
Clear aperture	1/4 the size of the CCD imager	
Mounting	C or CS Mount Threads	

Beam Expander

4X Beam Expander with UV Converter

Beam Expander

Beam expanders are designed to work with C-mount threaded cameras that have 4.5mm imager back focal spacing or with CS (12.5mm) back focal spacing. The 4X beam expander is an expanding telescope that images the beam as it looks at 8mm from the end of the expander onto the CCD while enlarging the image 4X. In addition to the 4X beam expander, other microscope objectives are available for expanding the beam even more. There are objectives for 6X, 12X, and 22X expansion. The various expanders allow the use of our 2% and 10% filters as well as the variable attenuator so as to accommodate the camera to a wide range of source intensities. With a camera having 4.4µm pixel spacing using the beam expander, the effective resolution can be as good as 0.5µm. The object plane that is imaged onto the CCD is located several mm in front of the assembly so even hard to get to focal spots and other small images are easy to image. The beam expanders are designed to accommodate up to 3 screw on filters or a variable attenuator behind them so a wide range of intensities can be accommodated.

For intensities too large to be accommodated by just filters, beam splitters are available to reduce the intensity before the beam expander. The beam expander is primarily intended for nonparallel beams such as focal spots and fiber tips. If small parallel beams are imaged, interference effects may occur. The 4X Beam expander can also be fitted with a UV converter plate at its object plane so that you can look at small beams in Wavelengths 193-360nm and expand them 4X.

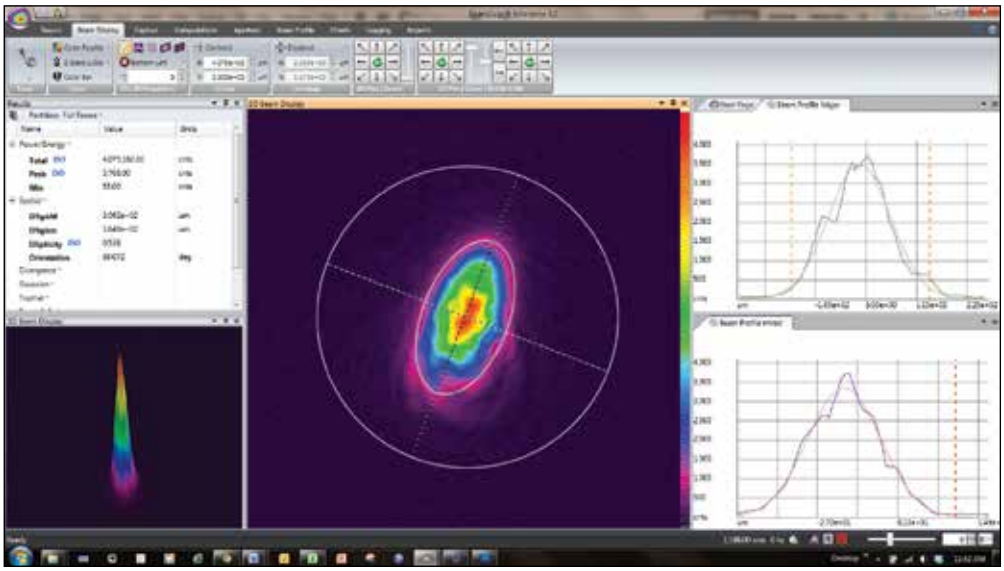
Camera with 4X beam Expander (SPZ17022)

Camera with 12X Expanding Microscope Objective (SPZ08259)

Specifications

Model	4X	6X	12X	22X
Wavelengths	340 - 1800nm	530 - 1100nm	530 - 1100nm	530 - 1100nm
Distance from lens barrel to focus	8mm	16.7mm	10.7mm	3.3mm
Distance from focus to 1st beam splitter	25mm	13mm	12mm	20mm
Distance of closest approach to focus with 2 beam splitter	85mm	73mm	72mm	80mm
Total length of assembly (without beam splitter)	50mm	107mm	101mm	102mm
Total length of assembly (With 2 beam splitter)	122mm	153mm	133mm	133mm
Part number	**SPZ17022**	**SPZ08257**	**SPZ08259**	**SPZ08260**

Accessories		
Spacer Set	Spacer set for connecting microscope objective 6X/ 12X/ 22X to 4.5mm, CS mount cameras	**SPZ08261**
Beam Splitter for 4X Expander	45 degree angle wedge beam splitter which mounts onto beam expander. Reduces beam intensity by ~20 times. For spectral range 190 – 2500nm. Introduces 35mm extra beam path to object plane	**SPZ17027**
Additional beam splitter	Additional beam splitter to mount to 1st beam splitte	**SPZ17026**



Shown is an image of the tip of a single mode fiber measuring 16µm by 30µm in the two axes.
The beam width as measured on the profiles shows 4X the actual size so we can measure to a resolution of ~2µm.

Camera with
4X Beam Expander SPZ17022
and SPZ17027 Beam Splitter

Camera with
4X Beam Expander SPZ17022,
SPZ17027 Beam Splitter and
SPZ17026 Beam Splitter

4X Beam Expander with UV converter

The UV converter is a UV sensitive fluorescent plate that can be mounted over the 4X Beam Expander.
The plate is positioned at the object plane of the 4X beam expander, 8 mm in front of the unit. When UV light at 193-360nm hits the plate, it absorbs the UV and re-emits visible light proportionate to the incident UV light. This light pattern is then expanded 4 times and imaged onto the imaged onto the C-mount camera.

Camera with
4X Beam Expander and
UV Image Converter

Specifications

Model	4X Beam Expander with UV converter
Beam Reduction	4X expansion ±2% with included correction factor
Wavelengths	193 - 360nm
Resolution	15µm x 15µm;
Minimum signal	~50µJ/cm²
Saturation intensity	~30mJ/ cm² at 193nm, ~15mJ/cm² at 248nm 20 times greater with optional beam splitter
Effective Aperture	1/4 the size of the CCD dimensions
Damage threshold	0.1J/cm² w/o beam splitter, 2J/cm² w/ beam splitter
Dimensions	Ø31mm dia x 120mm length
Part number	**SPZ17022 + SPZ17019**