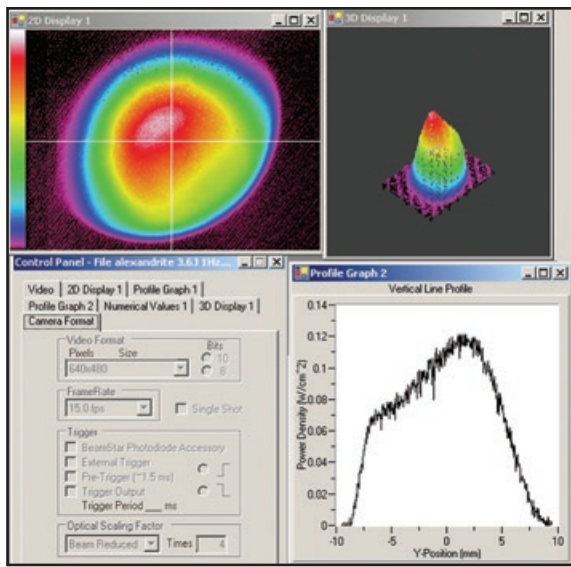


3.4.5 Beam Reducers

4X Reimaging Beam Reducer

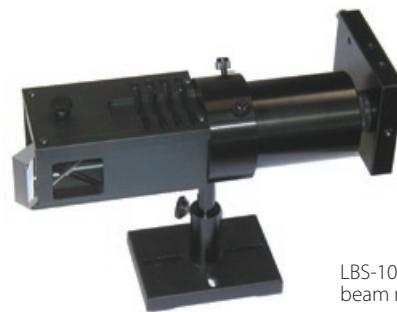
The 4X Beam Reducer is an imaging system that images the plane 30cm in front of the reducer onto the camera CCD sensor while reducing the size 4 times and inverting it. The beam reducer uses the 3 screw on attenuators provided with the camera. Since the intensity of a beam after reduction will be increased by $4 \times 4 = 16$ times, it is advisable to attenuate the beam more than you would without beam reduction. This can be done with additional external beam splitters and attenuators which are available (see ordering information). Note that the custom designed beam reducer gives better image quality than tapered fibers since it does not introduce graininess or uneven pixel response. Also the image distortion of $\sim 1\%$ is considerably lower than with most tapered fibers. The beam reducer is not compatible with CS mount cameras.



Shown is an image of an Alexandrite laser with beam diameter of 18mm. As can be seen, it is easily seen with the FX50 camera with the 4X beam reducer.



4X beam reducer



LBS-100 combined with 4X beam reducer

The 4X beam reducer can be combined with the LBS-100 beam splitter/attenuator system to attenuate higher power beams before reducing them in size

Specifications of 4X beam reducer

Spectral Range	390nm to 1100nm
Antireflection Coating	Antireflection coating optimized for 1064nm and 532nm
Beam reduction Accuracy	$\pm 3\%$
Size	$\varnothing 60$ mm dia x 94mm length
Aperture	50mm
Maximum Beam Size	SP 503/FX50: 25x19mm, FX 33: 18x14mm, SP 620 or GRAS20: 28x21.2mm
Distortion of Beam	Less than 1% over 80% of diameter
Damage Threshold	30mJ per pulse for nanosecond pulses

Ordering Information

4X Imaging Beam Reducer

Item	Description	P/N
4X reimaging beam reducer	Screw on beam reducer for beams in the wavelength region 360 – 1100nm that reimages the beam 30cm in front of the unit onto the CCD while reducing the beam size 4X. Entrance aperture is 50mm. Fits 4.5mm recess cameras only.	SPZ17017
Accessories		
Filter holder and 50x50 filter set for 4X beam reducer	Filter holder with set of 4 standard Schott 50X50mm neutral density filters. Useful to further reduce intensity after beam splitter before inputting into 4X beam reducer. Mounts to standard 1/4" thread, 1/2" diameter laboratory rod.	SPZ08240
LBS-100 to 4X beam reducer adapter	This adapter enables mounting of the LBS-100 beam splitter / attenuator assembly in front of the 4X beam reducer. The combined assembly can image large high power beams in one unit. See illustration on page 154.	SPZ17029