BOA Compressor

Bother-free **O**ptimized **A**rrangement

Winner of SPIE/Photonics Spectra's Prism Award for the top new optics product of 2009.

Swamp Optics' award-winning new single-prism pulse compressor solves essentially all the problems common to pulse compressors.

Unlike other pulse compressors, it uses only a single prism and a precisely manufactured corner-cube retro-reflector. This automatically aligned arrangement avoids all the problematic beam distortions of two- and four-prism designs (angular dispersion, spatial chirp, and pulse-front tilt). This guarantees the best focus of your pulse after a lens.

Also unlike other compressors, only the single prism angle need be rotated when the input wavelength is tuned. In addition, only the prism-corner-cube separation need be varied to tune the group-delay dispersion (GDD) over a wide range of values. And because this separation is tuned, rather than the prism insertion, the BOA can simultaneously accommodate pulses with large, as well as small, bandwidths.

Swamp Optics FROG

It's half as large as a two-prism compressor.

Aligning the beam into it is easy, too, using a simple alignment trick unique to the BOA.

The BOA is also much less expensive than currently available compressors.

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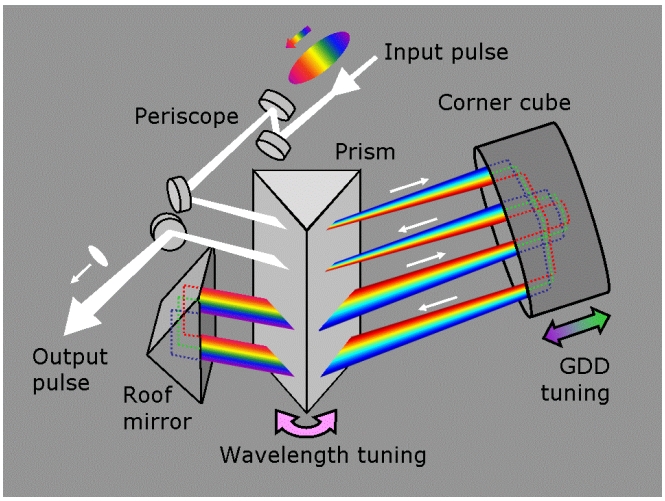
BOA COMPRESSOR MODELS AND SPECIFICATIONS

Pulse compressor model:	BOA-8	BOA-10
Prism material:	PBH-71	
Wavelength range:	750 – 1050 nm	1000 – 1100 nm
GDD range @ 800 nm:	-14,000 – +150 fs^2	na
GDD range @ 1000 nm:	-7,000 – +800 fs^2	-7,000 – +800 fs^2
Transmission[1]:	>70% @ 800 nm	>75%
Maximum bandwidth at minimum GDD[2]:	300 nm	100 nm
Maximum bandwidth near maximum GDD[2]:	40 nm	60 nm
Maximum peak power:	500MW	
Total additional beam path:	< 0.9 m	
Pulse repetition rate:	Any	
Angular dispersion ($d\theta/d\lambda$) added:	0	
Pulse-front tilt (dt/dx) added:	0	
Spatial chirp ($dx/d\lambda$) added:	0	
1D beam magnification:	1	
Output/input beam collinearity:	< 10 mrad	
Required input polarization:	Horizontal	
Polarization rotation:	<0.1°	
Required input-beam diameter:	1 – 4 mm (collimated)	
Input-beam lateral-displacement tolerance:	1 mm	
Number of alignment knobs:	Zero	
Time to set up:	~ 10 minutes	
Dimensions (L x W x H):	33 cm x 7.5 cm x 16.5 cm	
Weight:	3 kg	

1. The transmission varies with wavelength in the BOA-8 model, from ~ 70% at 750 nm to ~ 60% at 1050 nm.
2. As with all dispersive pulse compressors, the maximum bandwidth is limited by beam clipping on the second pass through the prism and so depends on the prism-corner-cube separation (and hence the device's maximum negative GDD). A unique advantage of the BOA single-prism/corner-cube design, which tunes GDD by varying this separation, however, is that, if less than the full negative GDD is needed, the beam path will be shorter, and, as a result, the compressor can accommodate a pulse with a larger bandwidth. In addition, the maximum bandwidth also depends on the wavelength and is slightly larger at longer wavelengths. Finally, users of any pulse compressor should keep in mind that, for large bandwidths, higher-order distortions will become apparent.

ADDITIONAL NOTES

- The deleterious spatio-temporal distortions—angular dispersion, pulse-front tilt, and spatial chirp, which plague traditional pulse-compressors—can be proven to always be identically zero.
- If your beam is larger than 4 mm, please let us know, and we can design a pulse compressor (kit or design) for you with a larger aperture.
- Alignment of the pulse compressor into a beam is achieved using a simple trick: turning a knob moves the pulse compressor input and output mirrors out of the beam. When the beam passes through its input and output apertures, the pulse compressor is then properly aligned.
- The pulse compressor itself is auto-aligning, so no alignment knobs are required, and no computer or external electronics is required.
- If the pulse compressor is bumped, as long as no beam cropping occurs, the BOA will remain aligned and the output beam will remain collinear with the input beam.



Layout for the BOA single-prism pulse compressor

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