

# femtoFBG

## A VERSATILE MACHINE OPTIMIZED FOR FEMTOSECOND LASER FABRICATION OF FIBER BRAGG GRATINGS (FBGS)



Newport's femtoFBG is the first commercially available workstation for fiber Bragg grating (FBG) manufacturing based on femtosecond laser direct-writing. This is the ideal tool for the end-user interested in combining fabrication speed and accuracy with Bragg grating design flexibility. The femtoFBG is capable of writing Bragg gratings in a large variety of fibers, from diverse materials and is designed for flexible FBG patterning, making it an enabling tool for multiple R&D applications.

Writing FBGs with Newport's femtoFBG provides a series of advantages versus more traditional fabrication processes. First, there is no limitation to using only sensitized fibers. The femtoFBG is capable of producing Bragg gratings in a wide variety of fibers. Second, the fiber does not need to be stripped of its polymer coating, saving processing steps and maintaining structural integrity. Third, FBGs manufactured with the femtoFBG possess higher thermal stability compared to FBGs fabricated with traditional UV exposure methods.

FBGs can be successfully manufactured with Newport's femtoFBG using point-by-point and line-by-line methods. In both cases, the operator has full design control allowing for the writing of uniform, chirped, apodized, and sampled FBGs. By adjusting the Bragg period and the laser energy per pulse, the femtoFBG is capable of producing FBGs with tailored Bragg wavelengths and spectral characteristics. For example, Bragg gratings with rejection bands of more than -30 dB can be formed at telecommunication wavelengths with bandwidths smaller than 0.5 nm.

Newport's femtoFBG is delivered with a personal computer loaded with proprietary software developed by the engineers and scientists in the Technology and Applications Center. With this tool, the operator has full control of all experimental conditions from irradiation parameters to complex motion design within an easy to use customer inspired GUI.

### Features and benefits

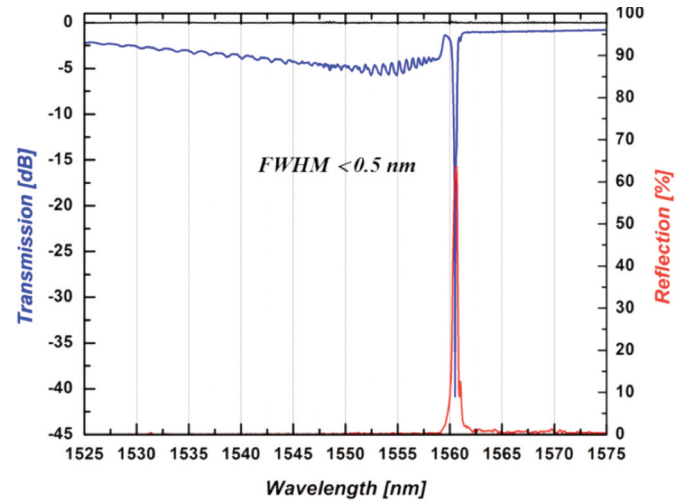
- Femtosecond laser direct-writing of FBGs
- Capable of writing Bragg gratings in a variety of fibers
- Capable of writing Bragg gratings through the fiber polymer coating
- Total control of all laser and writing parameters via flexible software
- Ideally suited to be used with Spectra-Physics Spirit, Spitfire, and Solstice lasers
- Robust and stable device with excellent thermal and vibrational stability
- Size (W x H x L): 12 x 20 x 20 in {30.5 x 51 x 51 cm} (excludes laser and table).

## Specifications

Laser wavelengths compatibility	Dual 1040 nm + 520 nm, or 800 nm
Beam entrance height	5 in (127 mm)
Laser power attenuation	Computer controlled from OD0 to OD4
Total travel distance (XYZ)	100 mm x 100 mm x 0.5 mm
Resolution and maximum speed (XY)	0.05 $\mu\text{m}$ and 300 mm/s
Resolution and maximum speed (Z)	< 1 nm and 2 mm/s
Focusing objective	40x, 0.75NA
Weight	175 lb. (79 kg)
Vision system	On-axis transmission light microscopy



Newport's femtoFBG with a Spectra-Physics Spirit laser.



Transmission and reflection spectra of an FBG fabricated in SMF-28 with Newport's femtoFBG.