

HC-1550-04

Hollow Core Photonic Bandgap Fiber



- < 5% of optical power located in silica
- Gaussian-like fundamental mode
- Can be filled with gas
- Negligible bend loss
- Fresnel reflection of core mode to air $\lt; 10^{-4}$
- Mode effective index close to unity
- Numerical Aperture ~ 0.2
- Pure silica for good temperature stability

Hollow core Photonic Bandgap Fibers guide light in a hollow core, surrounded by a microstructured cladding of air holes and silica.

Since only a small fraction of the light propagates in silica, the effect of material nonlinearities is insignificant and the fibers do not suffer from the same limitations on loss as conventional fibers made from solid material alone.

Applications

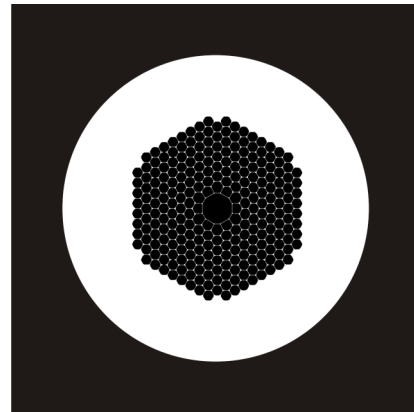
- Fiber optic gyroscopes
- Pulsed lasers (pulse delivery and/or compression)
- Gas spectroscopy
- Low latency communication

Physical properties	
Core diameter	$11 \pm 1 \mu\text{m}$
Cladding pitch	$4.1 \pm 0.1 \mu\text{m}$
Diameter of PCF region	$76 \pm 5 \mu\text{m}$
Cladding diameter	$121 \pm 2 \mu\text{m}$
Coating diameter	$220 \pm 30 \mu\text{m}$
Coating material	Single layer acrylate

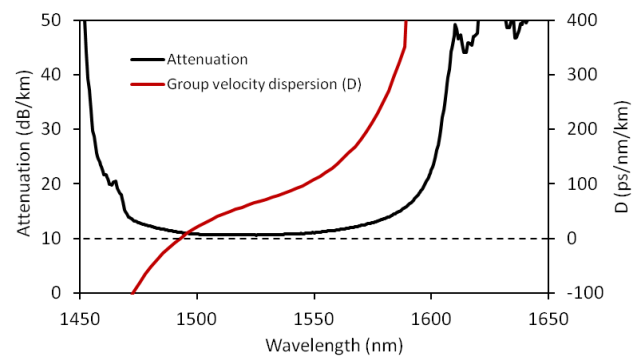
Optical properties	
Design wavelength	1550 nm
Attenuation @ 1550 nm	< 20 dB/km
Typical GVD @ 1550 nm	110 ps/nm/km
Operating wavelength ⁽¹⁾	1480-1580 nm
Mode field diameter @ 1550 nm ⁽²⁾	$9 \pm 1 \mu\text{m}$

1. Over which the attenuation is < 20 dB/km
2. Full $1/e^2$ -width of the near field intensity distribution

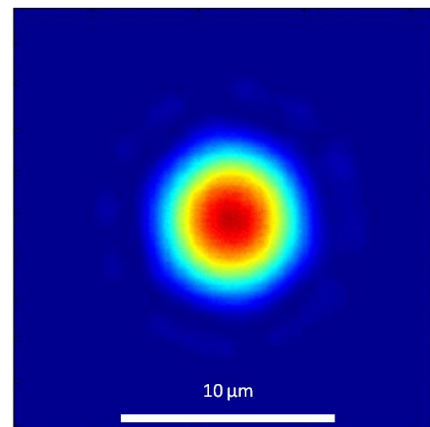
Schematic fiber cross section



Typical attenuation and dispersion



Typical near field intensity profile



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