NKT Photonics
the power of light

Crystal Fibre • *aero*LASE • Koheras • SuperK

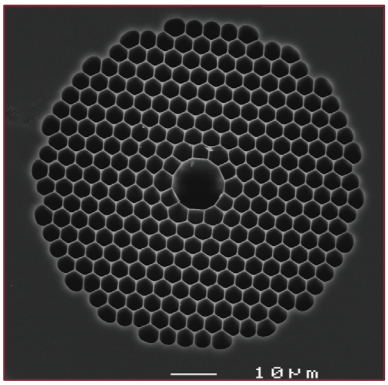
Hollow Core

Spectral Filtering

HC-1550-02

Hollow Core Photonic Bandgap Fiber

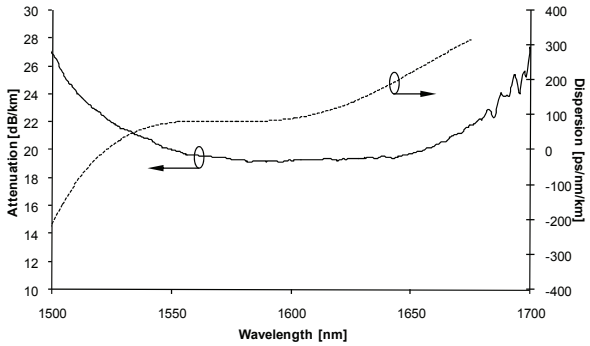
- ›95% of optical power located in air
- Quasi-Gaussian fundamental mode
- Can be filled with gas
- Low bend loss down to few mm bend radius
- Fresnel reflection to air at the end faces ‹10^{-4}
- Up to 75% of fiber cross section composed of solid silica, facilitating fusion splicing to conventional fibers
- Undoped silica for good temperature stability



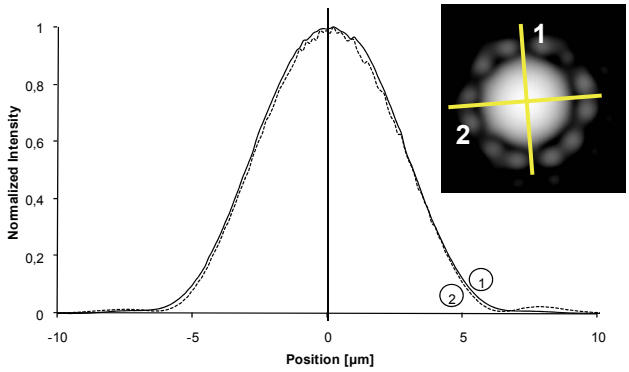
Photonic Bandgap Fibers guide light in a hollow core, surrounded by a microstructured cladding formed by a periodic arrangement of air holes in silica. Since only a small fraction of the light propagates in glass, the effect of material nonlinearities is significantly reduced and the fibers do not suffer from the same limitations on loss as conventional fibers made from solid material alone.

While hollow core PCF holds the promise to become the next generation ultra-low loss transmission fiber, it already finds important applications in power delivery, pulse shaping and compression, sensors and non-linear optics.

Typical attenuation and dispersion



Typical near field intensity



Physical properties	
Core diameter[1]	10 µm ± 1 µm
Pitch	3.8 µm
Air filling fraction in the holey region[2]	› 90%
Diameter of holey region	70 µm
Cladding diameter	120 µm
Coating diameter (single layer acrylate)	220 µm
Available length	Up to 1000m

Optical properties	
Center wavelength[3]	1550 nm
Attenuation @ 1550 nm	‹ 0.03 dB/m
Dispersion @ 1550 nm	97 ps/nm/km
Dispersion slope @ 1550 nm	0,5 ps/nm²/km
Dispersion slope @zero disp. wavelength	4.8 ps/nm²/km
Width of transmission band[4]	›200 nm
Fraction of light in air[5]	› 95%
Mode field diameter[6]	7.5 µm
Numerical aperture[7]	
Effective mode index[8]	~0.99
Mode shape overlap with std. SMF[9]	› 85%

1. *Core formed by removing 7 hexagonal unit cells of the cladding*
2. *Excluding core and outermost ring of holes*
3. *Other wavelengths available on request*
4. *Bandwith over which loss ‹ 0.1 dB/m*
5. *Derived from numerical model*
6. *Full 1/e-width of the near field intensity distribution*
7. *Sine of half angle at which a Gaussian fit to the far field intensity distribution has dropped to 1% of its peak value.*
8. *Derived from numerical model*
9. *Mode field diameters matched to provide best overlap*

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NKT Photonics A/S (Headquarters)
Blokken 84 • 3460 Birkerød • Denmark
Phone: +45 4348 3900
Fax: +45 4348 3901
www.nktphotonics.com

NKT Photonics GmbH
Schanzenstrasse 39 • Bldg D9-D13
51063 Cologne • Germany
Phone: +49 221 99511-0
Fax: +49 221 99511-650

NKT Photonics Inc.
1400 Campus Drive West • Morganville
NJ 07751 • USA
Phone: +1 732 972 9937
Fax: +1 732 414 4094