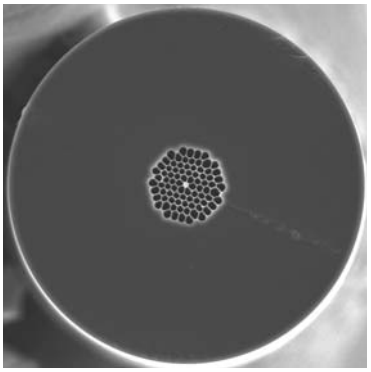
Photonic Crystal Fibers by

blazephotonics

## NL – 1.5 – 670



**Non-linearity:168 $W^{-1}$ $km^{-1}$**

**Zero dispersion λ=670nm**

**Single material**

**Spliceable**

# Highly nonlinear PCF

Our highly non-linear photonic crystal fibers guide light in a small solid silica core, surrounded by a microstructured cladding formed by a periodic arrangement of air holes in silica. The optical properties of the core closely resemble those of a rod of glass suspended in air, resulting in strong confinement of the light and, correspondingly, a large nonlinear coefficient. By selecting the appropriate core diameter, the zero-dispersion wavelength can be chosen over a wide range in the visible and near infrared spectrum, making these fibers particularly suited to supercontinuum generation with Ti:Sapphire or diode-pumped $Nd^{3+}$ laser sources.

## Unique properties of Highly nonlinear PCF

- Zero dispersion wavelengths from 670-880 nm available
- Non-linear coefficients from 34-215 $W^{-1}km^{-1}$ available (cf 1.1 $W^{-1}km^{-1}$ for SMF 28 at 1550 nm)
- Near-Gaussian mode profile

## Applications

- Supercontinuum generation for frequency metrology, spectroscopy or optical coherence tomography
- Four-wave mixing and self-phase modulation for switching, pulse-forming and wavelength conversion applications
- Raman amplification

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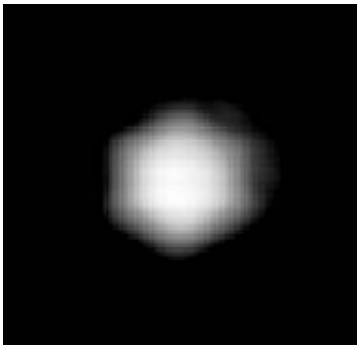

Typical measured near field profile (log scale)

## Optical properties

| | | |
|---|---|---|
| • Zero dispersion wavelength ($\lambda_0$) | | 670±5 nm |
| • Dispersion slope at $\lambda_0$ | | 1.00 ps·nm$^{-2}$·km$^{-1}$ |
| • Attenuation | $\lambda_0$ | < 320 dB/km |
| | 1550 nm | < 120 dB/km |
| | 1380 nm | < 500 dB/km |
| | 1000 nm | < 200 dB/km |
| | 600 nm | < 380 dB/km |
| • Mode field diameter[1] at $\lambda_0$ | | 1.0±0.1 µm |
| • Numerical aperture[2] at $\lambda_0$ | | 0.24 |
| • Effective nonlinear area[3] | | 1.1 µm$^2$ |
| • Nonlinear coefficient[4] at $\lambda_0$ | | 214 W$^{-1}$·km$^{-1}$ |

## Physical properties

| | |
|---|---|
| • Core diameter (average) | 1.5±0.1µm |
| • Pitch (distance between cladding holes) | 2.0±0.1 µm |
| • Air Filling Fraction in the holey region | >90% |
| • Width of struts holding the core | 70±10 nm |
| • Diameter of holey region | 22.0±0.5 µm |
| • Diameter of outer silica cladding (OD) | 104±1 µm |
| • Coating diameter (single layer acrylate) | 260±5 µm |
| • Available length | up to 1 km |

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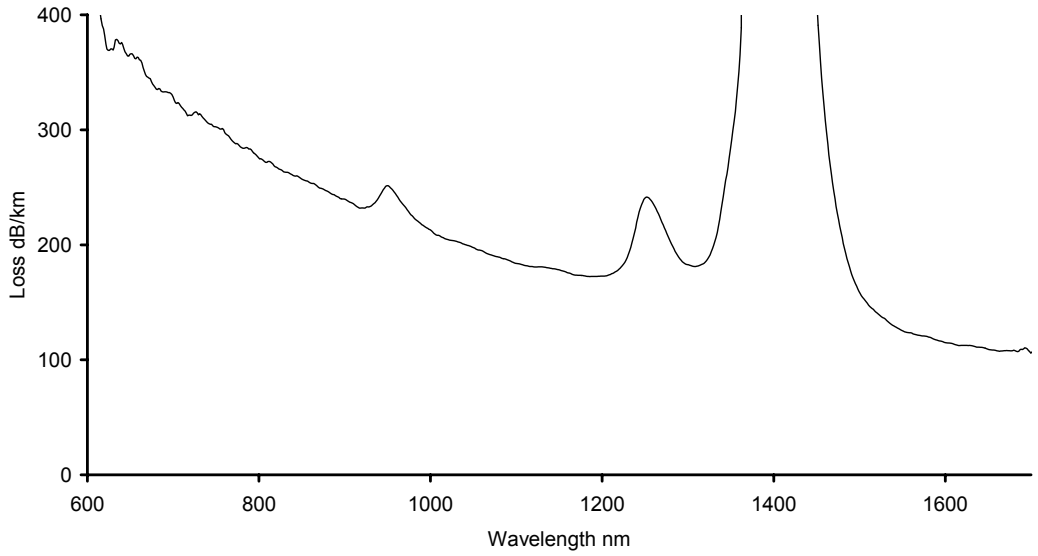
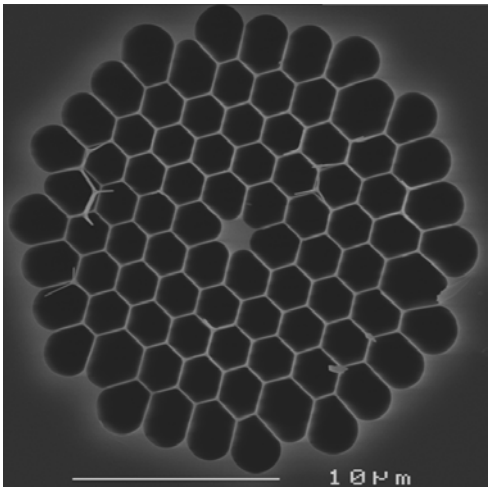
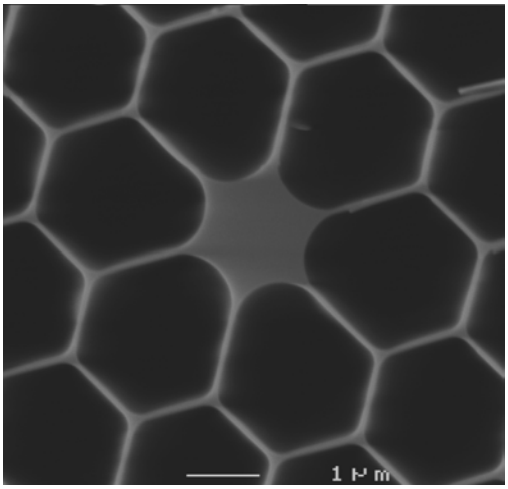
## Measured attenuation spectrum




## SEM image of PCF region and core

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## Notes

1 Full 1/e-width of the near field intensity distribution

2 Sine of half angle at which a Gaussian fit to the far field intensity distribution has dropped to 1% of its peak value

3 $$A_{eff} = \frac{\left( \int_{\infty} |\mathbf{E}(\mathbf{r})|^2 d^2\mathbf{r} \right)^2}{\int_{silica} |\mathbf{E}(\mathbf{r})|^4 d^2\mathbf{r}}$$

4 $$\gamma = \frac{2\pi n_2}{A_{eff}\lambda}$$

$n_2 \approx 2.5 \times 10^{-20}$ $m^2$ $W^{-1}$ for silica