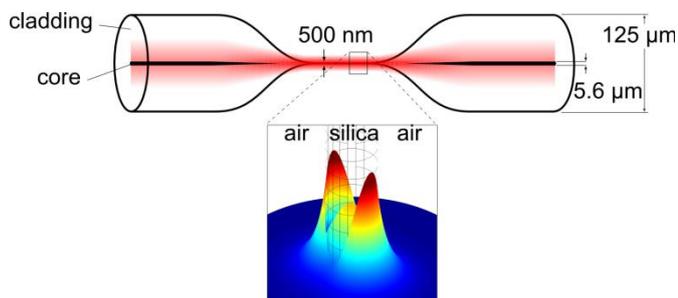


# PhD and MSc positions in optical microfibres team

Meschede Research Group

Institute of Applied Physics, University of Bonn



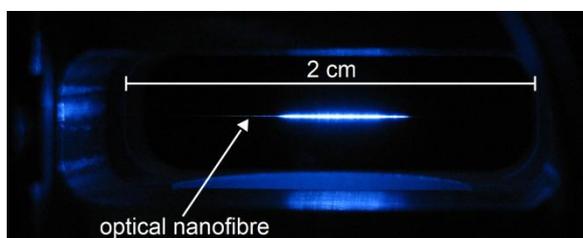
Due to very small fibre diameter, light partly propagates outside the fibre, along its surface, without being lost

## Interferometric sensing

Accurate computer control of the fibre tapering process allows us to create compact interferometers consisting of a single microfiber. Such devices are simultaneously mechanically stable and highly sensitive to the refractive index variation of the surrounding medium and thus can be used for dispersive sensing.

## Nonlinear optics

Due to very high light intensity at the microfiber waist, even pure silica microfibres exhibit nonlinear effects, such as second- and third-harmonic generation. Since the nonlinearity of the microfiber itself is small, we plan to enhance this process by placing the fibre into a chamber filled with a nonlinear gas or by coating it with nonlinear molecules.



Part of light, created by the second harmonic generation in a 400 nm thick fibre, is scattered at the fibre surface and is visible as the blue light here

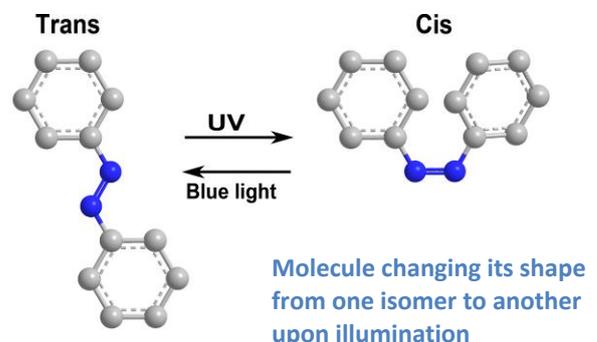
\* For an overview on microfibres and to contact us, visit

<http://agmeschede.iap.uni-bonn.de>

**Optical microfibres** are one of the current "hot" topics in photonics.\* Due to their extremely small diameter, a significant part of light propagates outside the fibre, as the evanescent field—open to interaction with the surrounding medium. This effect is accompanied by extremely tight confinement of light, and provides ideal conditions for enhanced light-matter interaction experiments. Our group is involved in several topics in this field.

## Control and manipulation of organic molecules

We can detect organic molecules adsorbed on the surface of a microfiber by ultra-sensitive absorption spectroscopy. Our goal is to switch between different states of photochromic molecules located on the microfibres surface. This can be realized using light of two different wavelengths propagating through the microfiber.



## Available topics for excellent master and PhD candidates

- microfiber-based interferometric sensors
- nonlinear optics with organic molecules on microfibres
- microfiber-based broad-spectrum laser source for fast interferometry
- microfiber-based sensors for liquid media
- construction of an optical microfiber processing apparatus
- any interesting idea you may have!