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# Micromachining of optical fibers with a Nd:YAG laser at 532 nm using a spatial filter

*Thursday, 14 July 2011 17:00 (2 hours)*

<p>Micromachining of single-mode telecommunication fibres (SMF28) was accomplished with a Nd:YAG laser at a wavelength of 532 nm. The goal of the micromachining process is to machine miniature Fabry-Perot interferometers in the fiber to manufacture fast temperature sensors. To produce micro features by direct machining the laser beam is focused to spot sizes of 30 μm and below. The different shapes of the micro features are accomplished with small apertures in close proximity and in line with the machining lens (focal length 24.5 mm).

We describe the experimental setup and the monitoring process. Two mirrors BB1-E02 were installed at an angle of 45 degrees to eliminate the infrared radiation at 1.064 μm. The apertures in line with the machining lens are projected onto the fiber, which was mounted on a three axis translation stage. The apertures could also be projected against the wall to assure homogeneous illumination. The fiber can be shifted between the machining area and a camera with 400 x magnification. The images are recorded with ProScope software, stored in a computer and displayed on a screen.

The focal point is established by generating a white light supercontinuum by air breakdown. The centre position on the fibre is found with the help of the diffraction pattern produced by the fibre. The machining frequency was 10 Hz and we found the best laser beam powers between 1 – 3 mW or 0.1 – 0.3 mJ/pulse. We managed to machine right through the fiber. The machining results will be presented.

## Level (Hons, MSc, <br>   PhD, other)?

RESEARCH PAPER

## Consider for a student <br>   award (Yes / No)?

NO

## Would you like to <br> submit a short paper <br> for the Conference <br> Proceedings (Yes / No)?

YES

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