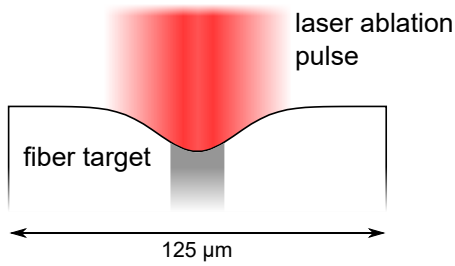
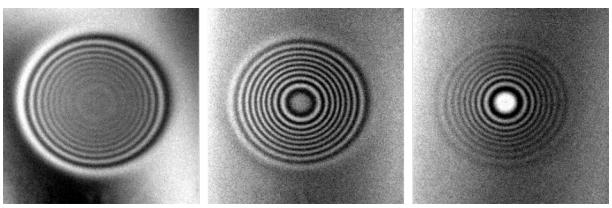
UNIVERSITÄT BONN

Master's Thesis in Experimental Physics

Improved fiber shooting for miniaturized mirror production





Series of interferometer images after shooting

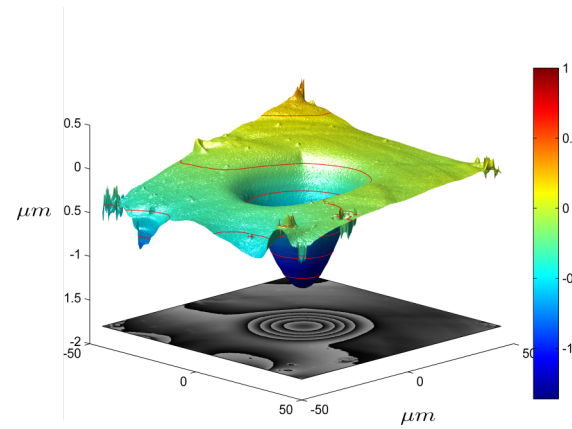
We produce ultra-smooth mirror shapes directly on the end-facets of optical fibers for the fabrication of miniaturized Fabry-Perot cavities. The concave depressions are milled via laser ablation with pulses from a CO_2 laser ($\lambda = 9.3$ µm).

The depression after a single laser shot is Gaussian as the laser beam. However, the desired shape for a Fabry-Perot cavity mirror is a large, spherical surface. This can be achieved by applying multiple laser shots (dot milling).

In this project you will develop and implement this technique in our setup. It includes computer-controlled laser milling patterns and laser pulse shapes.

What you will learn:

- Hands-on experience with a long wavelength infrared free-space optical setup
- Optical fiber manipulation techniques (fusion splicing, precision cleaving)
- Laser stabilization techniques
- Image ananlysis with MATLAB



3D reconstructed fiber surface

If you are interested, please contact: Prof. Dieter Meschede (meschede@iap.uni-bonn.de), Dr. Wolfgang Alt (w.alt@iap.uni-bonn.de).

For more details visit : http://quantum-technologies.iap.uni-bonn.de