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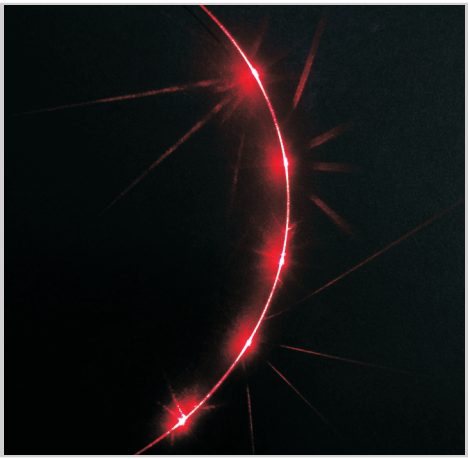
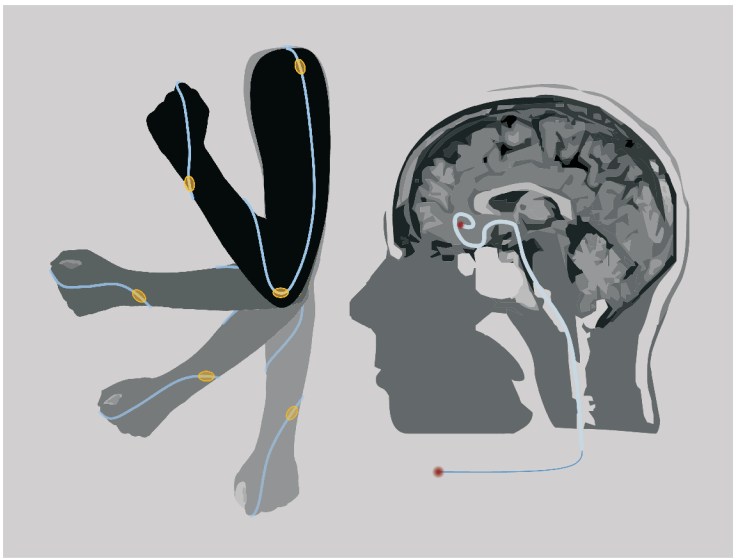
3D fiber optical shape and motion sensing

FiberNavi

FiberNavi





Application examples: (left) fiber optic motion capture, (right) surgical operations

Application fields

- Motion Capture
  - Rehabilitation
  - HMI (Human Machine Interface)
- Medical Sector
  - Heart Catheters
  - Medical Endoscopes
  - Colonoscopes
- Oil and Gas Industry
  - Downhole Monitoring
  - Deepwater Offshore Field Monitoring
- Maritime Sector
  - Flexible Cable Monitoring
  - Hydrophones

Technology advantages

- Small and light sensor system
- Immune against magnetic fields
- Integrable in existing systems
- Sensor constructed as disposal
- New femtosecond laser production technique

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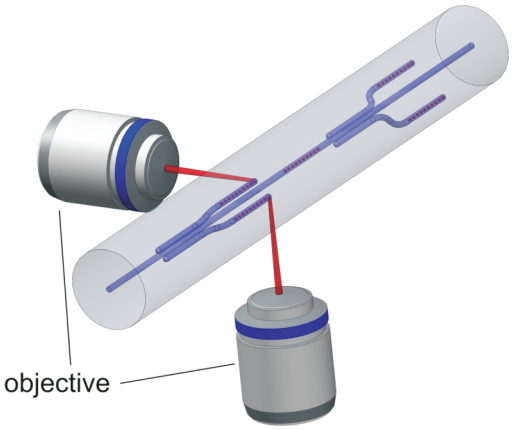


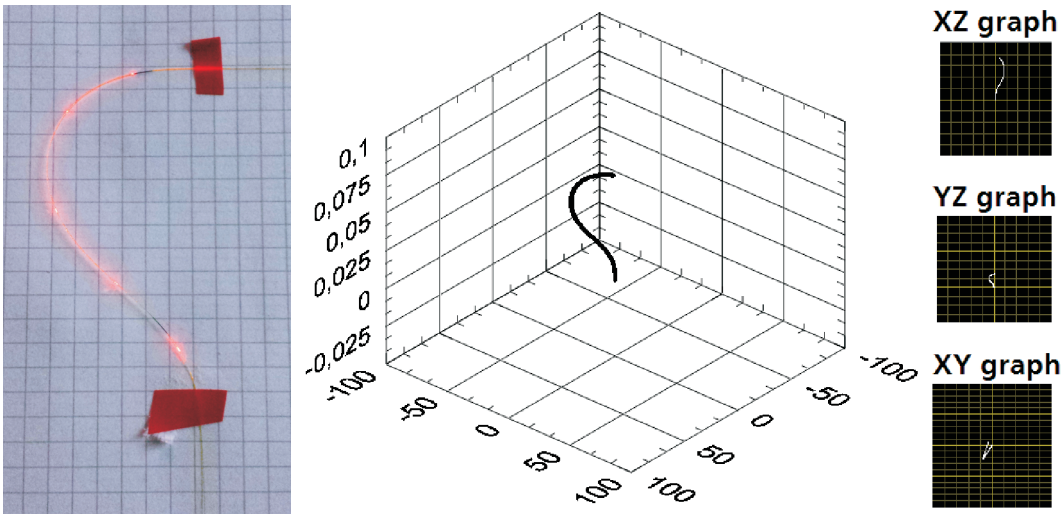
Schematic of the femtosecond laser process for a 3D sensor fiber with cladding waveguides and fiber Bragg gratings within them

3D Shape Sensing Approach

Direct femtosecond laser based processing of Bragg gratings into the core and the cladding of an optical fiber makes it possible using just a single standard one core optical fiber for 3D shape monitoring with the advantage of no need for additional optics, the high mechanical flexibility of a single 125 or 80 µm fiber and the use of commercially available standard connectors and components that are well known from telecommunications.

Patent pending DE 10 2013 205 205.7

Demonstration



Photograph of a 3D fiber at a bending radius of only 2.5 cm (left) with corresponding shape reconstruction (right).

Contact

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