

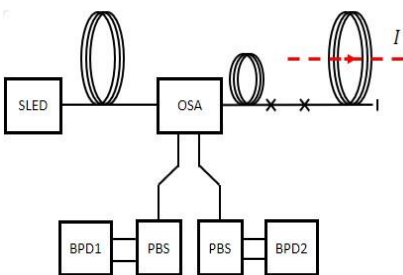
# Optical magnetometer current measuring system

## Optical measurement of electrical current with temperature compensation

### Invention

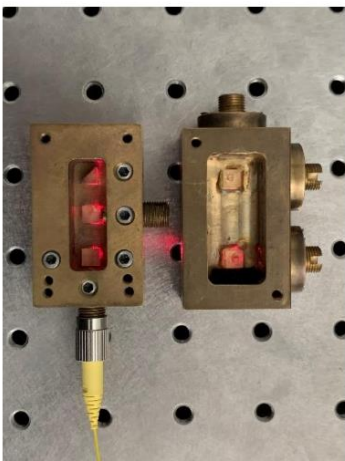
Optical current measuring systems are one way of measuring electric current touchlessly and contactlessly. They use light to determine current precisely. The advantage is that optical transformers are compact, saturation-free, linear, and high-precision. They can detect very large and very small currents in a broad frequency range.

TU Dortmund University has developed a new measurement procedure that can be used for both direct and alternating current. It consists of two radiation and fiber optic cable systems with the



Optical current measuring system setup

light of one fiber optic cable, the one surrounding the cable conducting the current, receiving a phase shift (Faraday effect) from the cable's magnetic field. One part of the light from the first beam splitter is conducted to the second beam splitter, from which the light beam is sent on to the quarter-wave plate. The two resulting light beams move through a collimator and an in-line calcite double breaker to photodiodes. An evaluation circuit thus allows electrical current in the current-carrying cable to be determined optically. The system functions in a temperature-compensated manner.



Coupling Unit

### Commercial Opportunities

Optical current measuring technology is used in all applications with high measurement accuracy and insulation requirements. These include high-current and high-voltage systems, compensation systems, and high-voltage direct current transmission systems. The new measurement procedure from TU Dortmund University can be used to measure both direct and alternating current. And it can be used for polarimetric measurement technology and in optical sub-assemblies, providing the advantages of fiber-optic technology, the most important of which are production scalability and enhanced resistance to interference.

### Current Status

Initial modelling has been performed and sub-circuits integrated. It has been registered with the German Patent and Trade Mark Office, and other international applications can be made in the priority year. We are offering interested companies the opportunity to license and refine this technology in collaboration with TU Dortmund University. The technology can also be researched as part of a project in which interested companies can participate.

### Relevant Publications

Planned for UPEC2024, Cardiff, Wales

An invention from the TU Dortmund University.

### Advantages

- Optical current measurement
- Low-cost polarimetric measurement technology
- Procedure for direct and alternating current measurement
- Temperature-compensated
- Very high measurement precision

### Technology Readiness Level

1 2 3 4 5 6 7 8 9

Technology concept formulated – modeling available

### Sector(s)

- Electrical engineering
- Measurement technology

### Ref.-No.

6606



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