Lichttechnisches Institut (LTI)
Engesserstrasse 13
Geb. 30.34
76131 Karlsruhe
www.lti.kit.edu

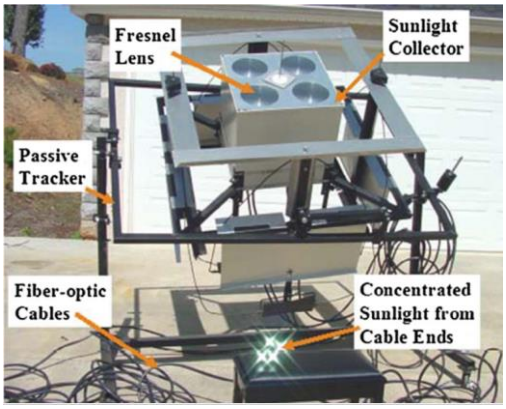
Master's Project – Title:

Solar tracking system for sunlight delivery into a lab

Motivation

Characterisation of materials relevant to solar light harvesting and solar light utilization is usually done in labs with a usage of solar simulators. However, even the most accurate AAA solar simulators do not specify parameters in UV and IR regions of spectra, an impact of which is extremely important for some studies and applications. The idea behind this project is to create a sunlight collecting system and deliver the concentrated solar light in the lab for diverse PV and photo catalysis studies. Similar systems are already exist for high-temperature applications and daylighting in buildings, however their optimisation is mainly done for to visible light spectrum and light power transmission. The main challenge of this project is to deliver a sunlight from a roof to a lab as unchanged as possible.

Aufgabe



Gorthala, Ravi, Meg Tidd, and Sean Lawless. *Solar Energy* 157 (2017): 629-640.

The "Nanophotonics for Energy" division was established at KIT in 2014 within the Institute of Microstructure Technology (IMT) and the Light Technology Institute (LTI). We are working on development of new solar cell materials, increase of efficiency of existing solar cells technologies and further sun light utilisation.

Currently we are looking for a motivated master student to design and assemble a Fresnel lens based sun-collection and fiber-coupled delivery system. This project involves following tasks:

- Assembling, setting up and testing of a solar tracker
- Design in CAD of a holder for a huge Fresnel lens to attach on existing solar tracker
- Search and choice of a suitable optical fiber and coupling of focused solar light into it
- Experimental investigation of sunlight parameters after the transfer of it into a lab.

An additional task can be a live cloud coverage detection with a camera and a consequent image analysis for a „clear sky window" forecast.

Voraussetzung

a. CAD knowledge
b. Basic knowledges in optics
c. Keen to learn programming of solar-tracker control and sensors for data logging
d. Not afraid to work outside (on sunny days!) with tools and a soldering iron!

Institut für Mikrostrukturtechnik (IMT)
KIT Campus Nord, Geb. 307
Hermann-von-Helmholtz-Platz 1,
76344 Eggenstein-Leopoldshafen
www.imt.kit.edu

Forschungsabteilung
"Nanophotonics for Energy" division of IMT / LTI

Ausrichtung
Experimental

Studiengang
Physics / Engineering

Einstieg
From: ASAP

Ansprechpartner
Dr. Dmitry Busko,
Prof. Bryce Richards

Telefon:
0721-608-23923

E-Mail:
dmitry.busko@kit.edu
or
bryce.richards@kit.edu

Web:
www.imt.kit.edu/richards.php