

## Lecture-Series April 22nd – April 26th, 2013

### Geometric Optics and Applications

by Professor Cristian E. Gutierrez (Temple University, Philadelphia, USA)

Professor Gutierrez is visiting KIT in Spring 2013. He will deliver a course for Master and PhD students from Mathematics and Engineering, who are interested in the field of **Geometric Optics and Applications**. The course consists of a series of 10 lectures (tutorials/problems are included).

**Location: Seminarraum K2, Kronenstraße 32**

**Time: 9-10:30 and 10:45-12:15 from Monday, April 22nd to Friday, April 26th.**

**Abstract:** This is a course about the application of geometric optics to reflection and refraction problems appearing in lenses and reflector antennas design.

A typical refraction problem we will solve is the following: suppose we have two homogenous media I and II with different indices of refraction, a light beam emanates from a point O in medium I and we seek an interface surface separating media I and II such that the light beam is refracted into either a set of prescribed directions or illuminates a target or screen object lying on a surface in medium II.

The first type of problem is called the far field problem and the second is called near field problem. The input and output intensities of radiation are prescribed and so the problem of finding the interface surface is a typical inverse problem.

The physical background underlying these problems will be deduced from the Maxwell equations, in particular, we will also study the case when there is loss of energy due to internal reflection.

The course would be of interest for master and PHD students in applied mathematics, physics and engineering. A prerequisite for the course is knowledge of mathematical analysis at the undergraduate level.

gez. Prof. Dr. Wolfgang Reichel