

A U S H A N G

FREIE UNIVERSITÄT BERLIN
Fachbereich Mathematik und Informatik

Promotionsbüro, Arnimallee 14, 14195 Berlin

DISPUTATION

Freitag, 10. Juni 2016, 10.00 Uhr

**Ort: Seminarraum 2006 im ZIB
Takusstraße 7, 14195 Berlin**

Disputation über die Doktorarbeit von

Herrn Martin Hammerschmidt

Thema der Dissertation:

**Optical simulation of complex nanostructured solar cells
with a reduced basis method**

Thema der Disputation:

Shape optimization in photonics

Die Arbeit wurde unter der Betreuung von **Prof. Dr. F. Schmidt** durchgeführt.

Abstract: The field of photonics relies on careful manipulation and tailoring of electromagnetic fields. In many applications the shape of a light scatterer is optimized with respect to a figure of merit which quantifies the fitness of the shape of the scatterer to enhance the absorption in solar cells or reduce transmission losses photonic waveguides. We focus on the numerical aspects of the solution of these PDE-constrained optimization problems where the constraint is given by the time-harmonic Maxwell equation. Very recently Hiptmair and Paganini proposed a shape optimization algorithm based on deformation diffeomorphisms discretized by B-Splines. It is tailored to preserve the approximation properties of the finite element method used to solve the state equation while allowing for high resolution of the shapes. We present the algorithm in detail and discuss the central theoretical and numerical results.

Die Disputation besteht aus dem o. g. Vortrag, danach der Vorstellung der Dissertation einschließlich jeweils anschließenden Aussprachen.

Interessierte werden hiermit herzlich eingeladen

Der Vorsitzende der Promotionskommission
Prof. Dr. F. Schmidt