



## Einladung

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Zeit: **Mittwoch, 11. November 2015, 10:15Uhr**

Ort: Technische Universität Berlin  
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Hardenbergstraße 36, 10623 Berlin  
**Raum EW 561**

Thema: **"Monolithic high contrast grating VCSEL"**

### **Abstract:**

Recent trend in the research focused on VCSELs dedicated to optical communication is to increase their speed and energy efficiency. In the same time, it is highly desirable to decrease the thickness of the VCSEL into submicron level and manufacture it easily with use of planar techniques in order to make it suitable for photonic integrated circuits.

We present results of simulations of a novel, ultra-small VCSEL device of extremely simplified design. The device uses monolithic high contrast grating (MHCG) mirrors instead of the commonly used distributed Bragg reflectors (DBR). We show that very high reflectivity, required to sustain a VCSEL lasing, can be achieved by a shallow patterning of the surface of the laser cavity while several  $\lambda$  thick resonator is characterized by thermal and electrical resistances comparable with standard, doped-DBR VCSELs. Thanks to the extraordinary features of the MHCG mirror, the cavity and the mirror can be made of a single material.

Presented results were obtained for GaAs-based VCSEL designed for 980 nm and GaN-based VCSEL designed for 414 nm. However, the concept is true for many other material systems like InP, GaSb or Si, etc.

Gäste sind herzlich willkommen!

Prof. Dr. J. Lott und Dr. T. Wernicke