

Physikdepartment Freie Universität Berlin  
Seminar "Selected Topics in Physics": Prof. K. Franke  
Talk by Felix Lang

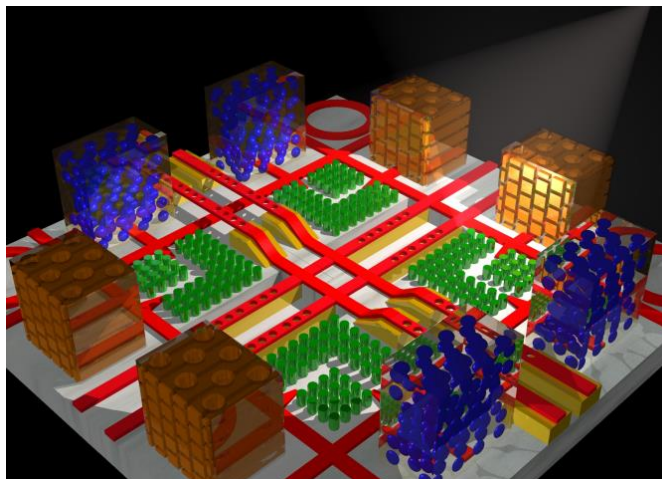
14.5.2013  
16 - 18 pm  
Room 1.1.43

## Photonic Crystals

### Can we control the flow of light?

A periodic arrangement of materials with different dielectric constants is called a Photonic Crystal (PC). By controlling these structures we can discover and exploit novel effects concerning the propagation and localization of light in these materials.

Motivated by the dream of "Photonic Computing", this talk introduces into the concept of Photonic Crystals. A simplified mathematical model will immediately lead to the concept of the photonic band structure. The talk will then focus onto the different PC types with 1D, 2D or 3D like periodicities, their properties and fabrication methods. Their use as photonic waveguides or cavities will be covered based on exemplary devices. Finally the talk will discuss some aspects of current research: from cavities and filters to the way of (optical) microcavities for strong coupling cavity electrodynamics (QED).



Picture 1: Artistic view of an integrated photonic circuit: "Photonic Micropolis", adapted from: Joannopoulos, J. et al (2008). *Photonic crystals: molding the flow of light*. <http://ab-initio.mit.edu/photons/micropolis.html> [Accessed April 29, 2013]