

CPP 53: Keynote Lecture III

Time: Thursday 9:30–10:00

Location: ZEU 222

Invited Talk CPP 53.1 Thu 9:30 ZEU 222
Interplay of Order and Disorder in Self-assembled Optical Metamaterials — ●ULLRICH STEINER — Adolphe Merkle Institute

Metamaterials are periodic structural arrays that allow the propagation of radiation in a fashion that is not observed in other systems, most notably a negative refractive index and super-focussing properties. The creation of metamaterials for visible light involves the manufacture of 3D arrays from plasmonic metals (gold, silver) with sub-100 nm periodicities. While micrometer-sized metamaterials for microwave and infrared-radiation can be lithographically manufactured, novel approaches are required for metamaterials that operate as visible wavelength.

In my presentation, I will introduce a concept that makes use of polymer self-assembly. Structurally chiral materials that form by self-assembly are replicated into gold and their optical properties are investigated. This leads to the creation of periodic plasmonic materials with an exceptional transparency for optical wavelengths and interesting circular and linear dichroism.

Since the optical properties of these nanostructured materials depend sensitively on the structural symmetry of the self-assembled lattice, special attention will be paid to the control of gyroid self-assembly in thin films, and how the perfection (or lack-therof) of the self-assembled morphology affects the optical properties of the material.