TRR 142
Tailored Nonlinear Photonics

TRR Guest Scientist Lecture / Seminar

Date/Time: 20.03.2018 / 15:00 Uhr
Location: Paderborn, P8.4.09

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Meta-optics: engineering optical magnetism with dielectric nanostructures

Abstract:

It is well-known that conventional optical materials demonstrate virtually no magnetic response to light as a direct action of the optical magnetic fields on matter is much weaker than electric ones. However, it is possible to engineer the light-matter interactions at the nanoscale to induce a strong magnetic dipole moment even though the involved materials do not possess microscopic magnetization. Artificial magnetism is among the key components for the emerging field of meta-optics.
Classical “meta-atom” is a metallic split-ring resonator where the induced electric currents generate efficient magnetic response. And historically, the field was associated with free electrons and electric currents at metallic interfaces studied by plasmonics. However, the recent developments of the physics of high-index dielectric nanoparticles suggest an alternative mechanism to generate magnetic response via the displacement current contributions associated with the excitations of Mie resonances.
I will cover our recent developments in high-index dielectric nanophotonics. This will include our results on all-dielectric two-dimensional flat optical components termed metasurfaces. Nowadays, metasurfaces match the performance or outperform conventional optical elements, and therefore certain efforts are put into their applications and commercialization. We will then outlook the great opportunities provided by dielectric meta-optics in the fields of nonlinear nanophotonics, and will cover our recent progress with dielectric nonlinear nano-antennas and metasurfaces.

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