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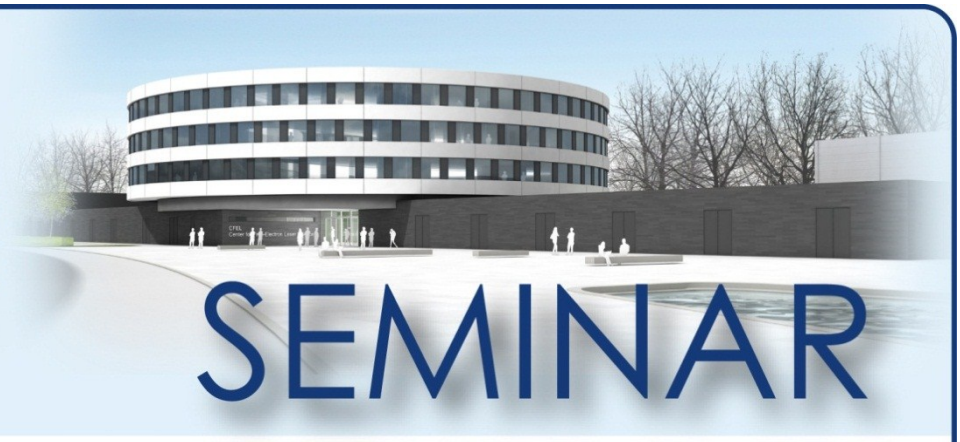

SEMINAR

10th April 2013 - 10:00 a.m.
Building 99, seminar room II

Haim Suchowski

NSEC, University of California, Berkeley

Nonlinear light-matter interaction with metamaterials

Nanostructures and metamaterials, man-made artificial sub-wavelength structures, have attracted interest in the nonlinear optics community due to the possibility of engineering their linear and nonlinear electromagnetic responses; however, in contrary to the linear optical response, the underlying physics to describe nonlinear light generation in nanostructures and the design rules to maximize the emission are still under debate. Much debate surrounds whether the nonlinear susceptibility at the nanoscale can be represented by an anharmonic oscillator model which implies a direct relation between the nonlinearity and a product of its linear susceptibilities.
In my talk, I share with you our current study of the second harmonic and third harmonic emission from geometrical dependence plasmonic nanostructures, where we resolve this debate, and show that nonlinear scattering theory and mode matching considerations are critically important for predicting the optimal geometry of the nonlinear emission from nanostructures. This conclusion, which connects the nonlinear generation at the nanoscale to the nonlinear far field emission, is found to be independent of the specific structure studied.
At the beginning of my talk, I will also give a short overview of the emerging field of nonlinear plasmonics, and will briefly discuss the underlying physics behind light matter interaction at the nanoscale.

Host: Franz X. Kärtner, CFEL UX Seminar