

Metasurfaces: modelling using computational electromagnetics

Background Context

The project aims at producing meta-surfaces enabling an unprecedented control of light in the visible and near visible spectral range (i.e. artificially designed surfaces with optical response and properties *beyond* (“*meta*”) what exists in nature). In particular, in these projects we aim here at controlling color or the polarization state of light.

Student Project(s) description

The student(s) will in the first part of the project aim at modelling the optical response of selected meta-surface designs primarily using COMSOL or FDTD simulations. The project will interact with both characterization and manufacture of similar structures. In the second part of the project it is interesting to solve large scale 3D problems, and perform optimization of structures. As the modelling task can be from small to moderate to huge, the student will in the second part of the project also aim at setting up the code for parallelization and use of the available super-computer facilities.

Responsibilities and Skills

For small scale simulations using COMSOL, the student needs only Matlab skills. For moderate to huge problems, the student must be familiar with UNIX and interested in learning scripting languages, and interested in studying and testing parallelization of the code in order to launch simulations on super-computers. For FDTD simulations the student need to be familiar with Linux and the C++ programming language.

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