Simulation of Aperiodic Nanostructures with Diffractive Optics Methods

Fourier analysis can be used to solve Maxwell's Equations and calculate optical properties of periodically nanostructured media. However, the exploited numerical Fourier Modal Method (FMM) can be extended to solve electromagnetic wave propagation problems associated with finite-sized structures, too.

To this end, non-periodic structure simulations via FMM have to introduce an artificial periodicity. In this case, undesirable interactions between neighboring structures are obtained unless an isolation is installed.

Such an isolation may be facilitated through a complex coordinate transformation which is conveniently introduced into the algorithm.

The project's aim is to develop numerical simulation tools and use them, amongst others, for the characterization of nanostructured polymer optical fibers and related applications as for example biosensors.