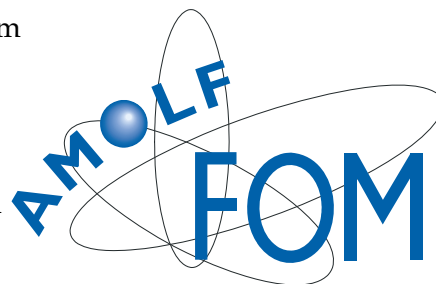


Resonant nanophotonics

Master projects at AMOLF

What's great about AMOLF

AMOLF is an institute with about 200 people, half of whom are researchers (staff, postdocs, PhD and master students) organized in research groups of around 8 scientists on average. As a master student you will participate as a full group member, taking part in discussions of everyone's latest results, sharing responsibility for infrastructure, and building up your own experiments. You will not only be trained as a good researcher in the lab. You will also witness the latest developments in all fields of nanophotonics, learn how to benefit optimally from collaboration between groups in the Center for Nanophotonics and hone your skills in presenting and explaining your ideas to a broad audience.



Projects in Resonant Photonics

In the group Resonant Nanophotonics (starting February 2008), we focus on nanoscale resonant scatterers, such as plasmon resonances and magnetic 'metamaterial' resonances. The goal is to combine resonances into a new class of ultrasmall functional optical circuits and antennas, especially designed to control the emission of light. Essential techniques will be: (1) state-of-the-art nanofabrication, (2) optical scattering spectroscopy, (3) high-resolution confocal and near-field microscopy, (4) scanning probe manipulation of nano-objects and (5) time-resolved fluorescence measurements. Master projects are:

- **Fabrication of meta-material resonances** You will push the available expertise in electron-beam lithography and focused ion beam fabrication to its limits by making metal scatterers with a magnetic resonance in the VIS/NIR spectrum, with feature sizes down to 20 nm. Near the end of the project you'll characterize these scatterers by optical scattering.
- **Nanoscope optical probe** To manipulate emission with nano-antennas we will position nanoscopic light sources attached to fine glass tips near optical structures with nanometer precision. You will develop the technique to attach emitters (quantum dots or dye-doped colloids) onto nano-tips, and will perform time-resolved fluorescence spectroscopy to quantify the properties of these on-tip emitters.
- **Design of nano-antenna** Resonant plasmon arrays are analogous to well-known meter-sized array antennas for TV and radio signals, but at optical frequencies. Using available models you will search for design rules for plasmon antennas that, once coupled to a quantum emitter promises high directionality of emission and a high spontaneous emission enhancement factor. You can fabricate your design and study it in scattering experiments.

Contact

Interested? Contact me for further information on available projects, and to discuss your interests. At the start of your project we will make a step-by-step plan in which working conditions and supervision will be agreed. For projects longer than two months, such as master projects, an agreement (stageovereenkomst) will be established in which, among other things, a financial compensation (stagevergoeding) will be fixed.

Femius Koenderink

Resonant Nanophotonics
FOM Institute AMOLF
Kruislaan 407
1098 SJ Amsterdam
E-mail: f.koenderink@amolf.nl
Tel.: 020-608 1234
URL: <http://www.amolf.nl>