Technical Optics

Klaus Boller

Pepijn Pinkse

Applied NanoPhotonics

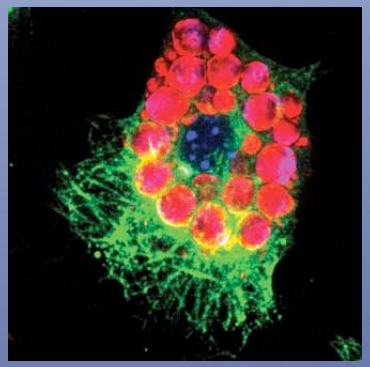
Light: central source of information

Human communication

Optical retrieval of ancient data

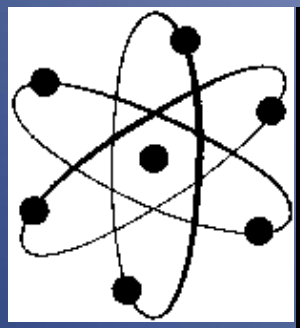
Optical Instruments: gain knowledge about the “invisible”

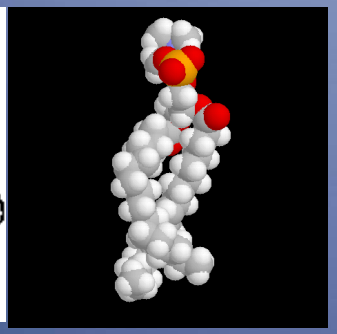
Living Cells



Microscope

Atoms & Molecules





Spectrometer

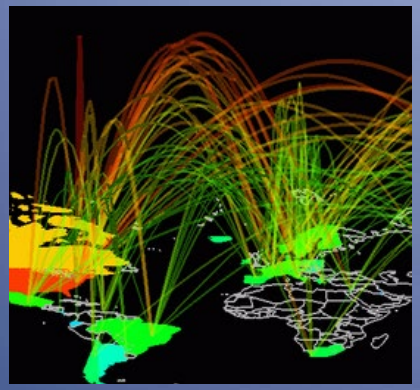
Universe

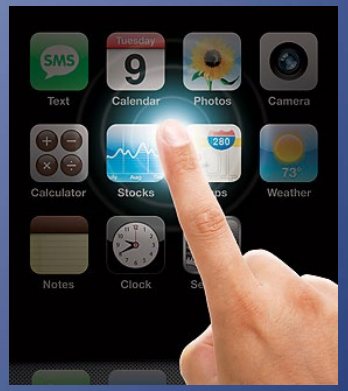
Telescope

What is this ?

Relevance of Technical Optics

Health **Communications** **Economy** **Environment** **Social**





Technical Optics

I **Lectures** on the themes:
Fourier transformations for EM waves
e.g. holography,
mode-locked lasers,
images,
no-go theorems

II **TO road trip** to academic / industrial research places

III **Student lectures** with coaching and feedback


DRESSING PROCEDURE
AIRBUS


esa


esa

~~Road Trip Technical Optics~~

Zoom Trip Technical Optics

T | Published 2013

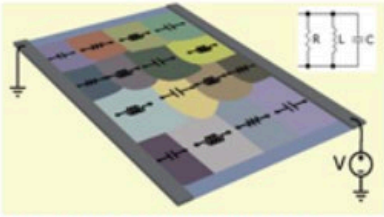
3 x 1 h visit

Leibniz Institute for Photonic Etchnology

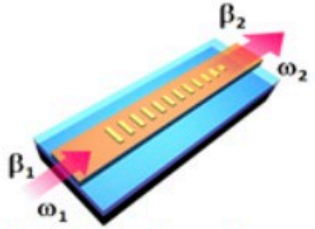
UvA

Harvard

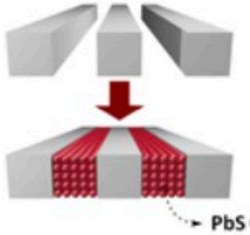
Metatronic circuit model



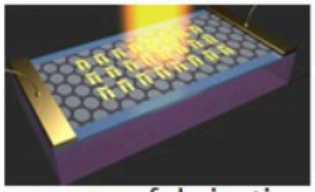
Control of guided waves



Hybrid metasurfaces



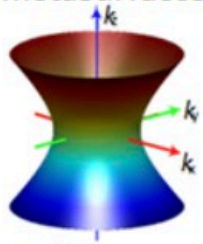
Multilevel metasurfaces

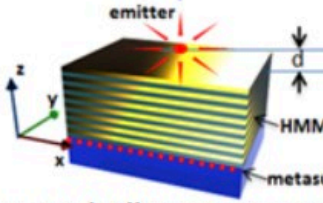


Large area fabrication

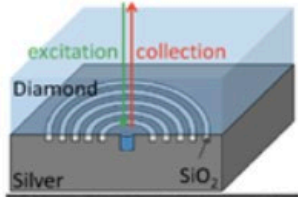
Quantum metasurfaces

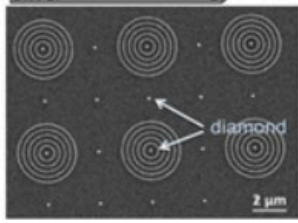
Quantum hyperboli metasurfaces



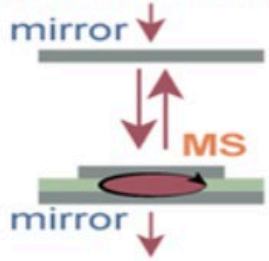


Diamond-Silver metasur





Ultra-small cavities



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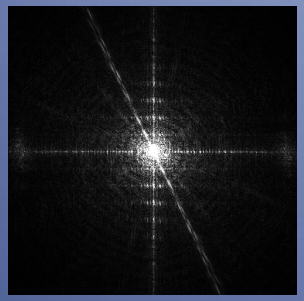
Lecturers: Klaus Boller   Pepijn Pinkse

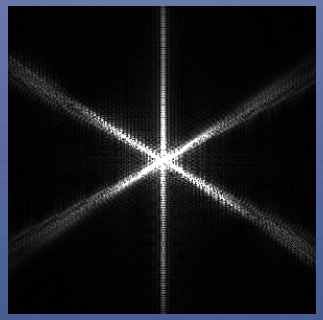
Book: Optics, 5th ed. by Eugene Hecht
Or Intro *Optics*, Pedrotti (Chapters 9, 21)

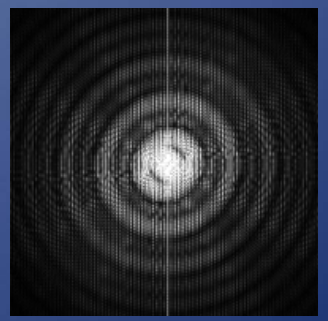
Grades: 60% written exam (covering topics from part I)
20% homework
20% presentation including annotations

The bridging item:

Fourier transforms — *live*







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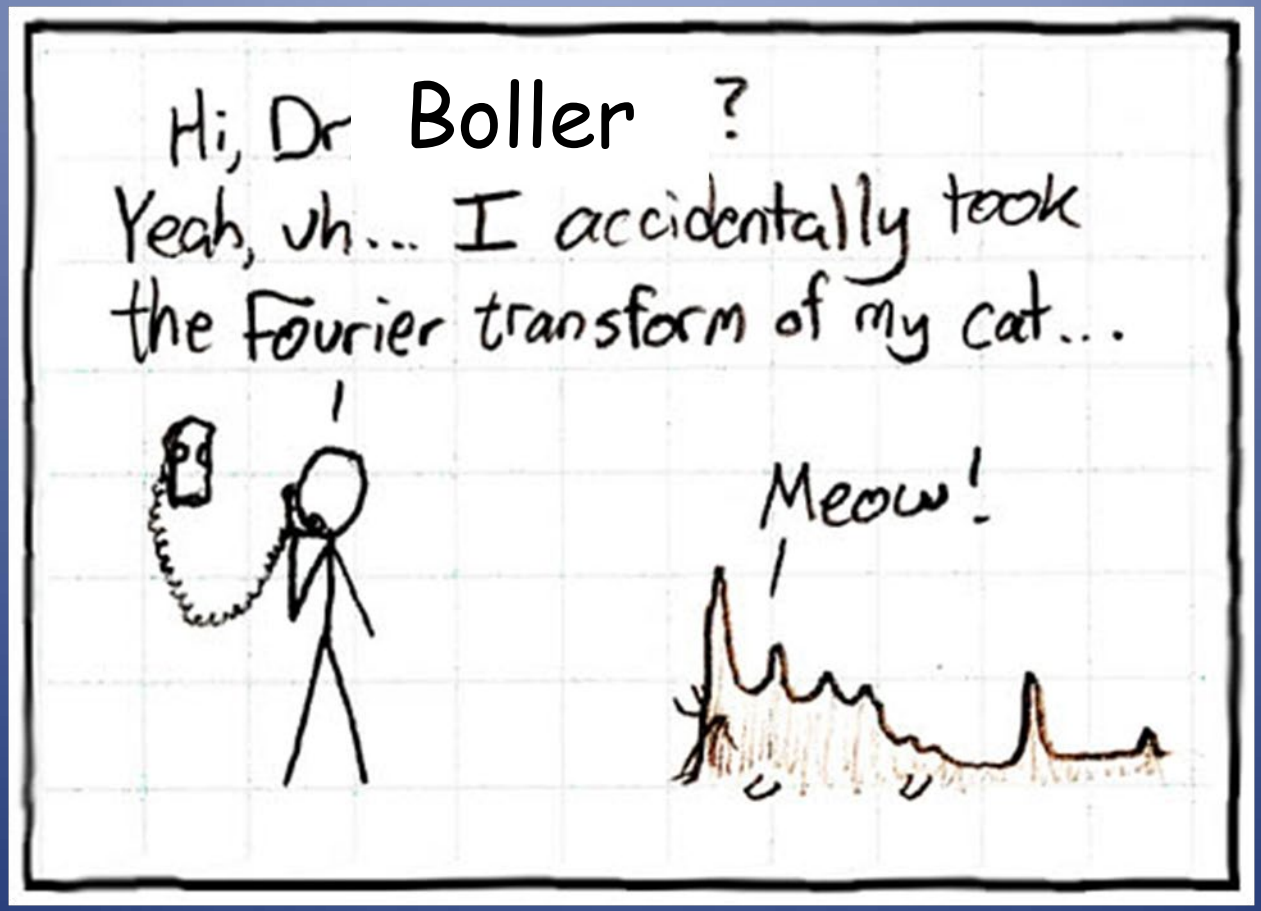
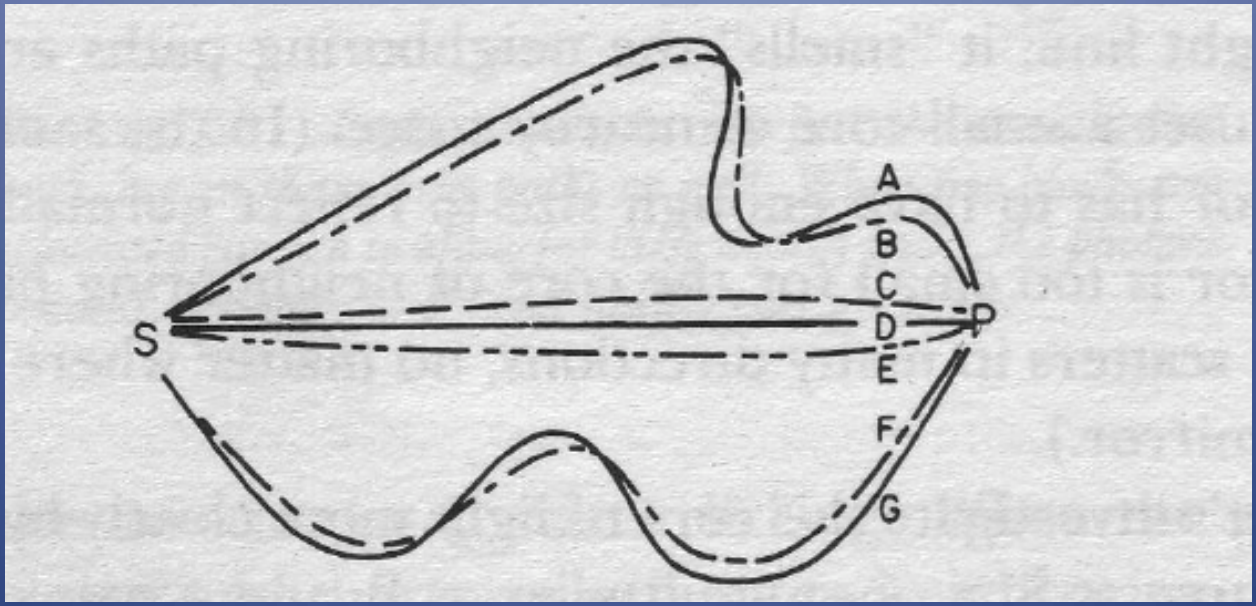


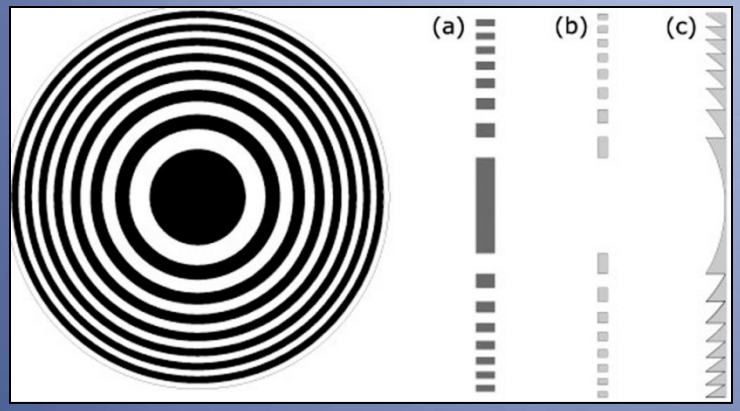
Diffraction of waves

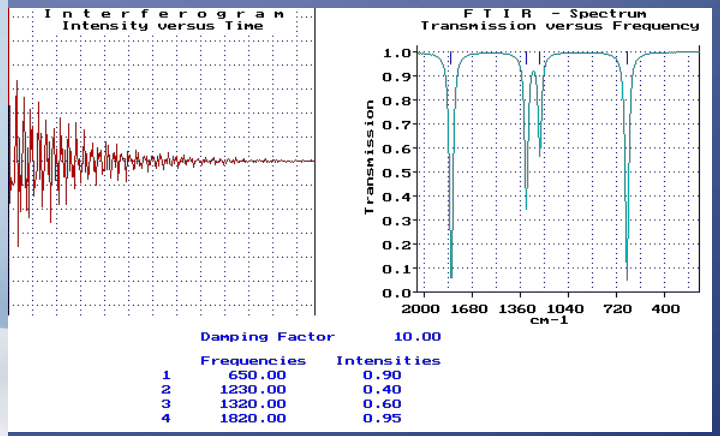
Diffraction of light vs photons: which path do they take?

"A Strange Theory of Light"
by Richard Feynman

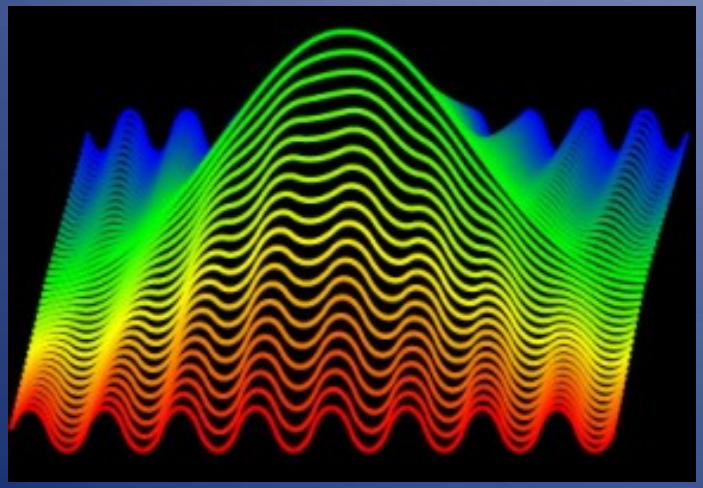


Applications of FT in optics



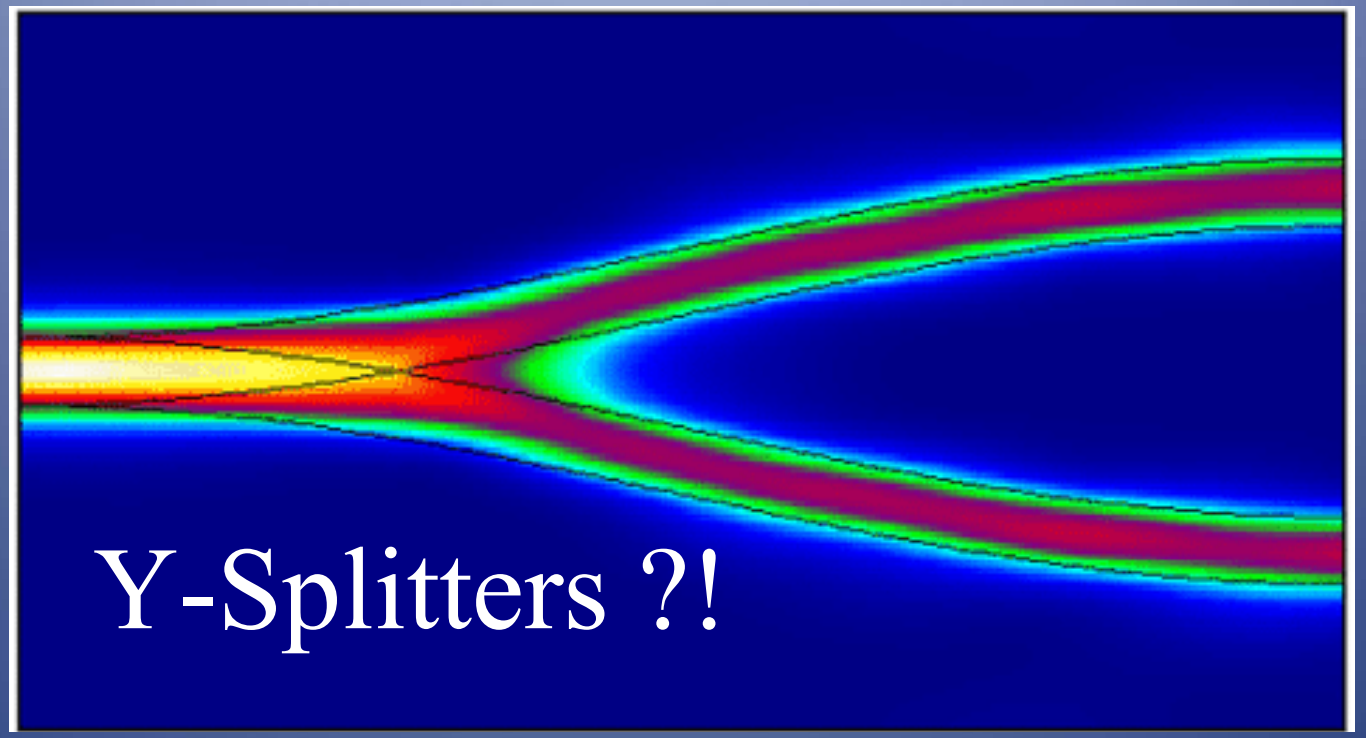


Can this be true ?



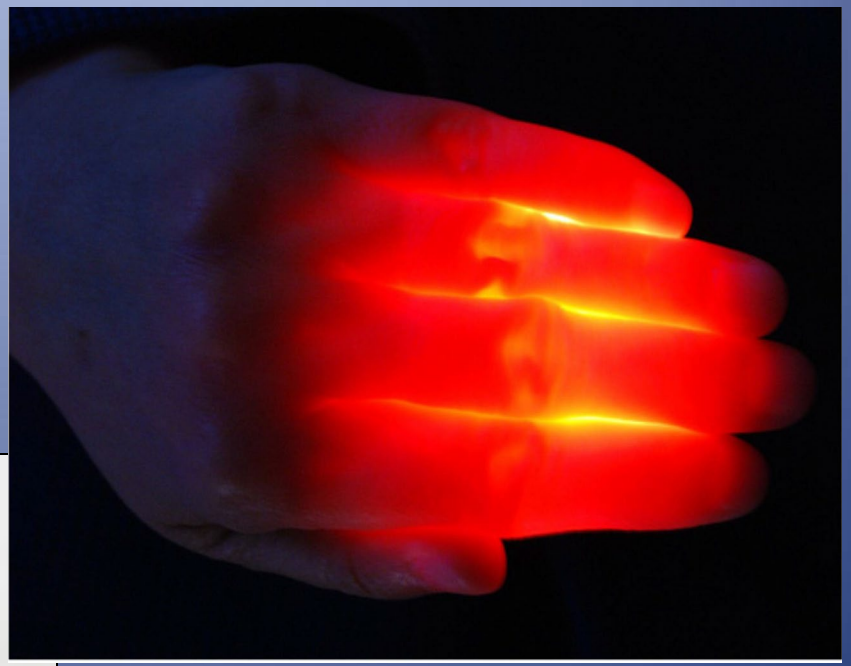
Shape light in time

No-go Theorems



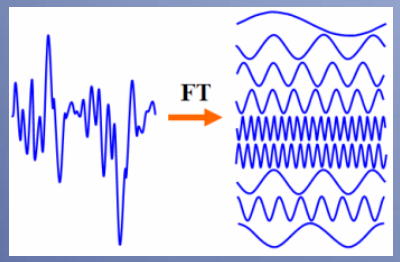
Time-reversal, Etendue, Phase-Space arguments

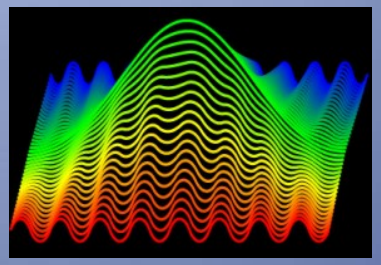
Shape wavefronts through “stuff” !



To be achieved

1. Understand more of the beauty of light





2. Follow up great Dutch scientists

3. Prepare for your next adventures and jobs

Look beyond Technical Optics:

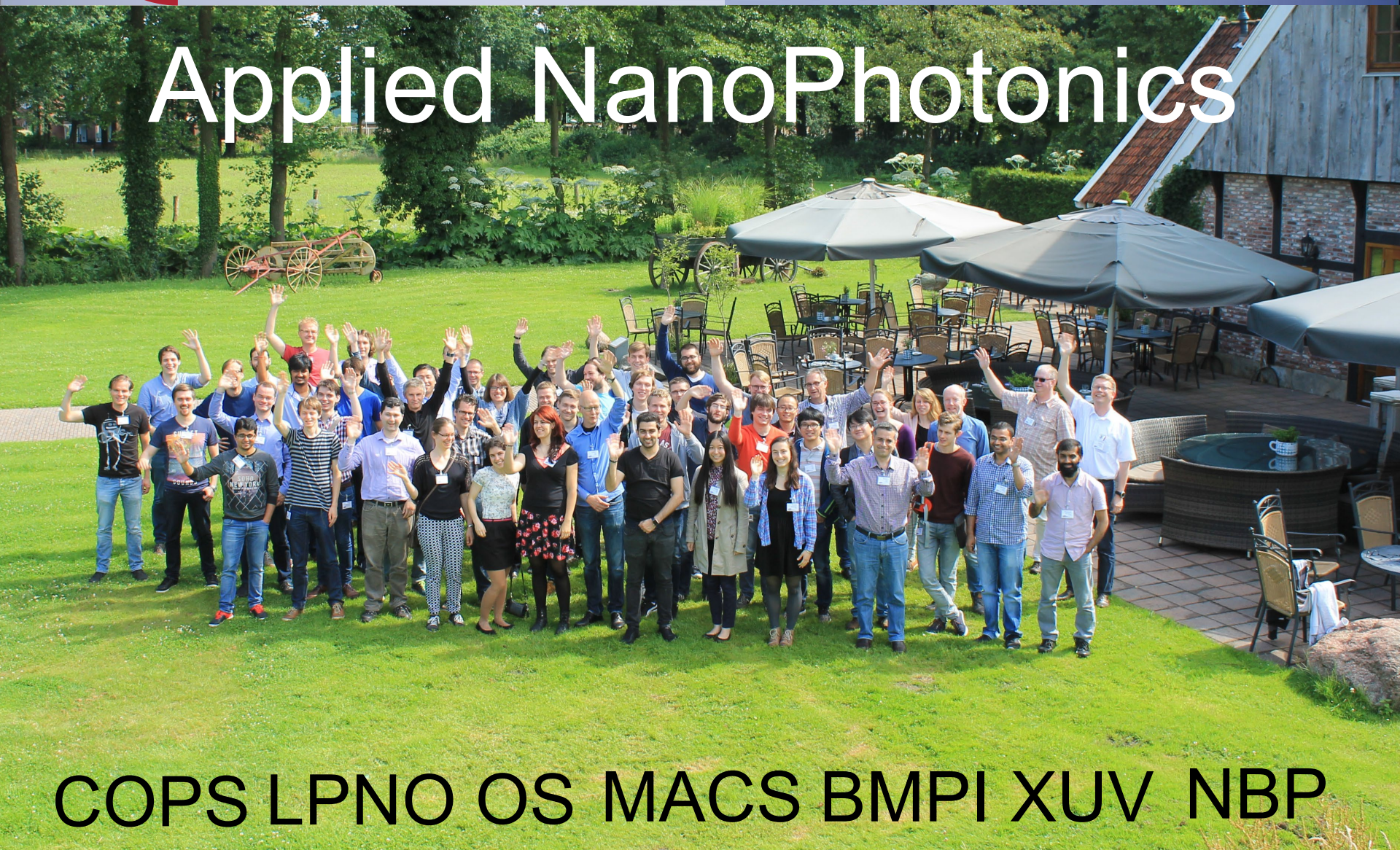
- Internship
- MSc project
- PhD ?

Elective courses

Laser Physics, Wave Optics, Quantum Optics, Nanophotonics, Nanooptics, Nonlinear Optics, etc…

APPLIED
NANOPHOTONICS

Applied NanoPhotonics



COPS LPNO OS MACS BMPI XUV NBP

Begin with serious fun in optics & photonics

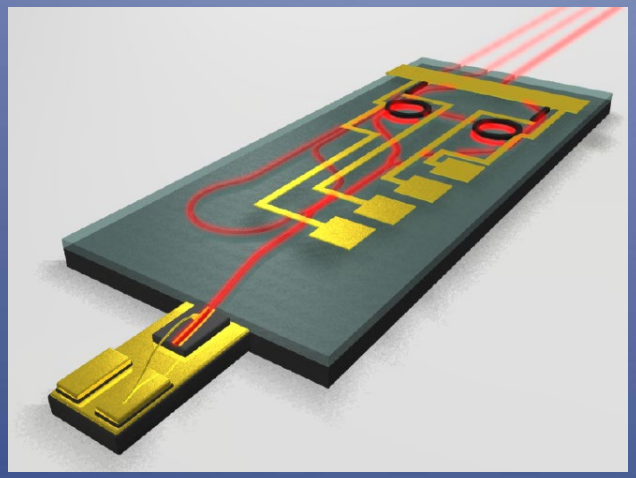
Examples of recent ANP collaborative highlights

APPLIED NANOPHOTONICS

see-through

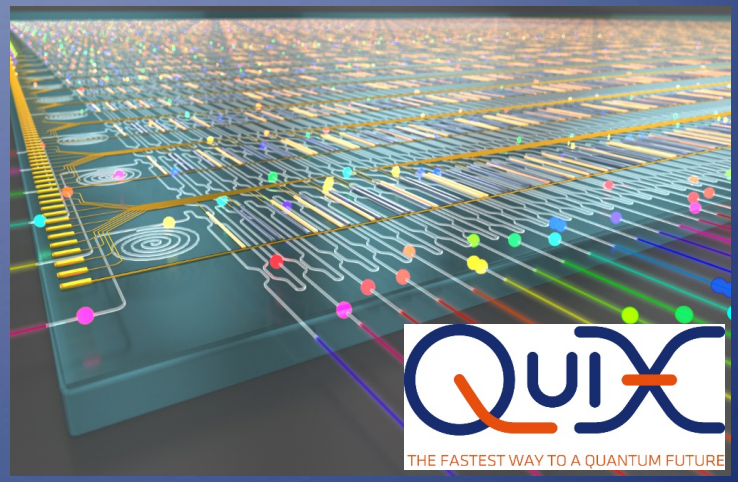
COPS & NBP

Lowest linewidth



LPNO & OS

Quantum photonic processor



LPNO & AQO