

Lessons Plan

Lecturer 1: Jacopo Bertolotti

“Optical Wave Scattering”

Lesson plan

1. Scattering theory

- Extinction, scattering and absorption
- Cross sections
- Scattering matrix and the Stokes parameters
- The Optical theorem

2. Mie theory

- Normal modes
- The extinction paradox
- Whispering gallery modes

3. Scattering from small particles

- The Electrostatic Approximation
- Non-spherical particles
- Metal particles

4. Multiple scattering

- Field multiple scattering and the Lambert-Beer law
- Intensity multiple scattering and the diffusion approximation
- Speckle and speckle correlations

Research seminar: *“Imaging and tracking with speckle correlations”*

Lecturer 2: Marian Florescu

“Hyperuniformity and Local Self-Uniformity in Photonic Systems: Fundamentals and Applications”

Lesson plan: *to be announced*

Research seminar: *to be announced*

Lecturer 3: Monika Fleischer

“Steering and analyzing interactions between single nanoantennas and emitters”

Lesson plan: *to be announced*

Research seminar: *to be announced*

Lecturer 4: Francesco Monticone

“Fundamentals of light interaction with complex media and metamaterials”

Lesson plan:

1. Fundamental principles: Causality, passivity, reciprocity, etc.
2. Physical constraints on the optical properties of (meta)materials
3. Fundamentals of effective medium theory
4. Unconventional electromagnetic wave propagation and scattering effects.

Research seminar: *to be announced*