

Theoretical optical spectroscopy :

1. Definition of optical spectroscopy and examples (absorption, SHG ...)
2. Electronic excitations
3. Linear response theory for finite and infinite systems : response functions, dynamical polarizability and macroscopic dielectric function. Theoretical treatment in Density-Functional Theory, Time-Dependent Density-Functional Theory and Quantum Chemistry approaches.
4. Beyond the linear response : how to solve the time-dependent Schroedinger equation and obtain the relevant physical quantities. Description of phenomena in strong laser field for finite and infinite systems. Theoretical treatment in Density-Functional Theory, Time-Dependent Density-Functional Theory and Quantum Chemistry approaches.