

Course: Quantum Electrodynamics for Chemistry

Duration: 24 hours

Teacher(s): Stefano Corni

Curriculum: Chemical Sciences

Description: Recent experimental and theoretical works have pointed to the use of the quantum nature of the electromagnetic radiation to modify and (perhaps) to engineer the photochemistry of molecules via the creation of hybrid light-matter states (polaritons) in the strong coupling regime. In the first part of this course, the theory leading to the quantization of the electromagnetic field will be presented, as well as its use to explain basic optical phenomena such as absorption, stimulated and spontaneous emission. The focus will be in explaining the concepts and the tools that are then needed to understand current photochemical experiments in the strong-coupling regime. In the second part of the course such tools and concepts will be used to explain some of the selected theoretical and experimental works that address molecular photochemistry in the strong coupling regime. The course may be of interest both for theoretically oriented PhD students, and to experimentally oriented ones who want to get acquainted with the language used in these works.