



Course unit English denomination	Quantum Electrodynamics for Chemistry
Teacher in charge (if defined)	Stefano Corni
Teaching Hours	24
Number of ECTS credits allocated	3
Course period	09/2025
Course delivery method	<input type="checkbox"/> In presence <input type="checkbox"/> Remotely <input checked="" type="checkbox"/> Blended
Language of instruction	English
Mandatory attendance	<input checked="" type="checkbox"/> Yes (50% minimum of presence) <input type="checkbox"/> No
Course unit contents	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.
Learning goals	Knowledge: Basics of QED, quantized field-molecule interactions Skills: manage simple hamiltonians for molecule-quantized field interaction Competencies: understanding research papers on QED applied to Chemistry
Teaching methods	Frontal teaching
Course on transversal, interdisciplinary, transdisciplinary skills	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Available for PhD students from other courses	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Students external to the PhD Course admitted upon evaluation of the CV by the teachers



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Prerequisites  
(not mandatory)

max 3750 caratteri

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**Examination  
methods**

Presentation and discussion of a research article

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Study material

Slides/articles provided by the teacher

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Additional  
information  
(not mandatory)

max 3750 caratteri

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