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ΔΙΑΛΕΞΗ

"Quantum-Engineering by Coherent Light"

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Αίθουσα σεμιναρίων στο ισόγειο του ΕΙΕ

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The continuous miniaturisation of electronic devices and the need for design and manipulation at the nanoscale level have stimulated extensive research in quantum-engineering in recent years. The control of quantum systems, the creation of arbitrary states of light and the development of methods for quantum information processing are major objectives of this research. Coherent light is a common central element in such investigations, since it provides a powerful tool for the manipulation of quantum systems, as well as being an important target system itself for quantum-engineering.

In this talk, I will present recent theoretical work on various aspects of quantum-engineering by coherent light, including the time-dependent quantum dynamics of prototype molecular compounds interacting with laser fields and the recently developed Coherently Controlled Adiabatic Passage (CCAP) method. The CCAP is a merger of the Adiabatic Passage technique and the Coherent Control methodology. It allows selective and complete population transfer between an initial state and several energetically accessible target states connected via different quantum pathways. Diverse applications of CCAP, such as novel molecular devices operated by laser pulses, creation of specific light-matter entangled states for quantum information processing and targeted genome manipulation by optical means, will be also briefly discussed.