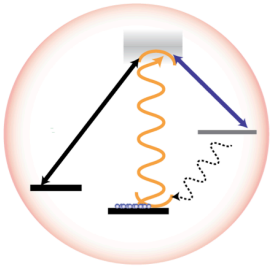

Quantum Photonics and Engineering -

A conceptual-experimental approach

ECE 49595 – Fall 2018

Course description

This course introduces basic differences between the classical and quantum physics and enables students to mathematically describe simple quantum phenomena. It provides general knowledge about applications of quantum mechanics in engineering and its limitations. The quantum computation, quantum communication and quantum sensing are among the applications we discuss in this course. Prerequisite for this course is ECE31100 or PHYS34200.

Light-matter interactions
Entanglement Quantum radiation
Communication Atomic clocks
Young's interference Dirac notation

Instructor

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Assistant Professor of Electrical and Computer Engineering

Schrödinger and Maxwell-Bloch equations Absorption
Uncertainty principle Quantization of field and wave-particle duality
Superposition Computation and precision sensing Coherence

Quantum computing

Information processing governed by quantum superposition and entanglement may revolutionize the computation as we know it today. In this course, we discuss the basic principles of quantum computation and its implementation in different platforms including photonic quantum computations.

Classical to quantum regimes
Photon statistics Laser and cavity
Decoherence and noise

Quantum communication

Laws of quantum physics guarantees the security of communication when quantum states of light is used to encode and transmit information. In this course, we discuss the basic principles of quantum communication and its potential implementation.