Physics 710
<< Quantum Optics >>

Spring 2021

Instructor: Dr. Y. H. Shih

Office: PHYS 310
Telephone: 2558 (o), 2796 (Lab.)

Lectures: Tu Th 6:00 pm - 7:15 pm

Room: Web Meetings

Text: Yanhua Shih <<An Introduction to Quantum Optics>> (Second Edition)

References: Eugene Hecht <<Optics>>
Rodney Loudon <<The Quantum Theory of Light>>

Prerequisites: Student should have had standard courses in Quantum Mechanics, Electrodynamics (or Electromagnetic Theory) and Mathematical Physics or Engineering Mathematics. In particular, it will be assumed that the students understand the basic theory of ordinary differential equation, basic material about Fourier transform and vector analysis.

Grading Method: Five summaries, one research paper.

Summaries: The due day of each summary will be noticed.

Office Hours: W 12:30-3:30pm. I am usually in my Lab. (Rooms 010, 011) and happy to speak with you any time. Call me before your visit.

Topic Outline:

I. Maxwell's EM Wave Theory of Light
II. Einstein's Granularity Picture of Light
III. Quantum Theory of Light
IV. Measurement of Light
V. Coherence Property of Light
VI. Superposition, Diffraction, Propagation and Imaging
VII. First-order Quantum Coherence of Light
VIII. Second-order and Higher-order Quantum Coherence of Light
IX. Quantum Entanglement
X. Quantum Interferometry and Imaging
XI. Fundamental Problems of Quantum Theory