

Introduction to Quantum Optics

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Prerequisite: classical electrodynamics and quantum mechanics at the undergraduate level.

Content:

1. Quantization of electromagnetic waves-photons
2. Fock states, coherent states, thermal states.
3. Squeezing, entanglement
4. Planck distribution
5. Quasi-probabilities
6. Optical beam splitter
7. Two level atoms, Jaynes-Cummings model, Rabi oscillations, quantum revivals
8. Dynamics of spontaneous emission
9. Superradiance
10. Optical Bloch equations
11. Quantum theory of open systems and quantum trajectory method
12. Bell inequalities and their optical test