

From Quantum Interference to Quantum Simulation

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In this talk, I will introduce the basic concept of quantum interference and its applications in lasing without inversion, spontaneous emission cancellation, quantum dynamics in photonic crystals and superradiance lattices. The quantum interference in three-level systems is the key mechanism leading to lasing without inversion and spontaneous emission cancellation, which can be further modified in engineered vacuum. Quantum interference and superradiance can be combined to construct superradiance lattices, providing a new platform to simulate exotic quantum matter at room temperature.