

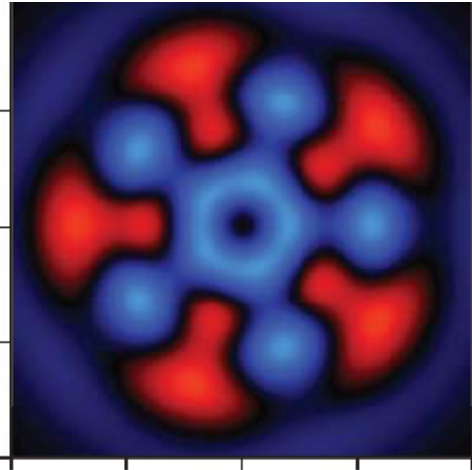
Introduction to Quantum Optics for Scientists and Engineers

Fall 2020, TTh 3:30-5:20

Course number: EE539*

Instructor: Kai-Mei Fu

Superposition of vacuum and 5-photon state
Hofheinz et al., Nature 2009



In the past two decades, the interaction of light and matter has reached an unprecedented level of control, enabling us to begin to realize technologies based on quantum mechanics. This course aims to give students the analytic and computational tools to understand and simulate current state-of-the-art quantum optics experiments.

The course consists of

- Introduction/review of the quantum mechanics operator formalism (2 weeks)
- Non-classical light (2 weeks)
- Atom-classical field interaction (2 weeks)
- Atom-quantum field interaction (2 weeks)
- CQED applications (2 weeks)

The coursework consists of 7 problem sets and 1 final presentation.

The only requirement for EE539 is a strong background in linear algebra. Quantum mechanics and electromagnetism is helpful, but not necessary. Prior graduate students have come from EE, physics, chemistry, and materials science. Undergraduates should have completed PHY324 and PHYS325, or have permission from the instructor.

*Register for PHY576 if EE539 is full.