

Towards an observation of wave function collapse of entangled photons

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GPPU Experimental Point (GEP): 4

Goal of Study

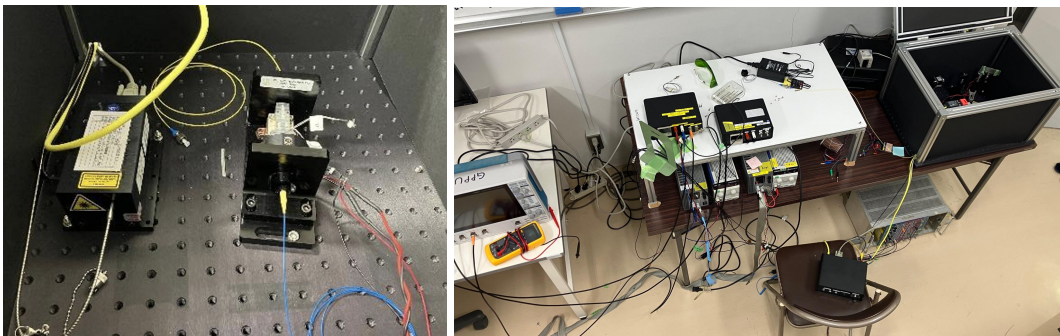
In this course, you will learn about single near-infrared photon detection, fiber-based optomechanics, generation of entangled two-photons and strange phenomena in quantum mechanics such as quantum eraser.

Contents

The ultimate goal of this project is to observe ‘wavefunction collapse’ of photon polarization by the decoherence of the entangled photons. The equipments to be used are a laser, polarization entangled 1550 nm photon source, single-photon avalanche diode and fiber optomechanics etc.

In this year, we aim

1. to assemble single photon avalanche diode (SPAD) for 1550 nm photon detection
2. to confirm entanglement of two photons using polarization beam splitters
3. and to construct interferometers



Textbook and References

https://en.wikipedia.org/wiki/Spontaneous_parametric_down-conversion
“Double-slit quantum eraser”, doi.org/10.1103/PhysRevA.65.033818

Progress Schedule

- ✧ Day 1
Lecture 1: single photon avalanche diode (SPAD) and its read out
Experiment 1: operation of SPAD
- ✧ Day 2
Lecture 2: generation of entangled two-photons
Experiment 2: generation of entangled two-photons
- ✧ Day 3
Experiment 3: confirm entanglement of two photons using polarization beam splitters
- ✧ Days 4
Experiment 4: construct an interferometer and confirm interference

Other Details

Course Period	Summer 2026
Place	Physics & Chemistry Annex 1 st floor
Number of Students	1—4
Evaluation method	The evaluation method will be based on the discussion during the experiment (70%), and the presentation or report after the experiment (30%).

In Addition

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