

The Development of Proving an Existence of Single Photon by Three Detectors

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The study of quantum optics in Mahidol Wittayanusorn School has established for four years. The latest study was conducted by attenuating blue laser and using the down-conversion crystal. The result of that study was a degree of second-order coherence = 0.412 ± 0.014 which violating the classical inequality. However that is not completely confirmed that single photon exists. The solid confirmation is produced in this study by using three detectors. The 405 nm laser was pumped into the down-converted crystal and 810 nm two beams emitted like a cone. The first beam called G path went to the photon detector and the second traveled to the beam splitter. The second beam was split into two paths, T and R paths, and also went to the photon detectors. For collected the coincident data, the coincident circuit was used as the counting module. Using three detectors with the same laser source obtained the result that = 0.027561 ± 0.000515 which violate the classical inequality ≥ 1 by the 1888 standard deviation within 30 min of counting time. The result is better than previous study and the concrete confirmation of the single photon existence is completely proved.

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