Exercises

- 1. Calculate the value of $g^{(2)}(0)$ for a classical monochromatic light wave with a square wave intensity modulation of ±20%.
- 2. A light source emits a regular train of pulses each containing exactly 2 photons. What value of $g^{(2)}(0)$ would be expected?
- 3. A quantum dot with a radiative lifetime of 1ns is used to make a single photon source. What is the maximum photon rate (number of photons per second) that can be achieved?
- 4. A light source emits a train of single photons with exactly regular time intervals between them. Sketch the $g^{(2)}(\tau)$ that would be expected: (a) when the time interval between the photons is very much larger than the response time τ_D of the detector; (b) when the time interval is very much smaller than τ_D .

Exercises

- 5. Consider a 50:50 beam splitter where input and output fields are related as:
 - $\hat{a}_3 = \sqrt{T}\hat{a}_1 \sqrt{1 T}\hat{a}_2$ $\hat{a}_4 = \sqrt{1 T}\hat{a}_1 + \sqrt{T}\hat{a}_2$



- a) what is the output state for an input of $|0_1, 0_2>$
- b) find the output states for inputs of $|1_1, 0_2>$ and $|1_1, 1_2>$
- c) find the output for an input state $|1_1, 1_2\rangle$ and discuss the physical implications