

~~TOC~~

## Antibunching by histogramming - Slow Decay

**Q.: How can we avoid decay at very long time delay (up to 5us)?**

**In this show-case the external preconditions are:**

- detectors: perkin elmer SPCMAQR14
- 700 nm SP filter in front of one of the APDs
- sample: diamond nanocrystals (100 nm), we are measuring the antibunching of the NV centers emission
- laser wavelength: 532 nm, cw
- T3R Measurement with PicoHarp Software

**A.: The decay can be caused by blinking of the nanodiamonds.**

### A decay caused by correlation statistics

This decay is caused by correlation statistics. This happens because you correlate the first arriving photon against a photon at the longer time, which will be an increasingly unlikely event because the earliest stop photons always win and the experiment restarts.

I attached a simulation.

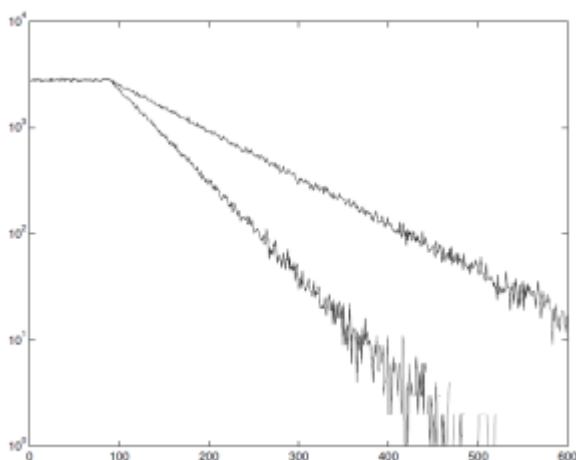


Fig. 1: Logfile logf.png

The timescale is in ns. The plateau is the [dead time](#). The decay slope depends on the count rate.

The way to avoid this is to calculate the total correlation after T2 MODE MEASUREMENT. This is not a start-stop correlation but the correlation of every photon against every photon.

It can be done using the SymPhoTime Software ([http://www.picoquant.com/products/sw\\_mt/sw\\_mt.htm](http://www.picoquant.com/products/sw_mt/sw_mt.htm)).

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