~~TOC~~

T3R Antibunching - 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

On top of an eventual blinking you will have a decay 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.

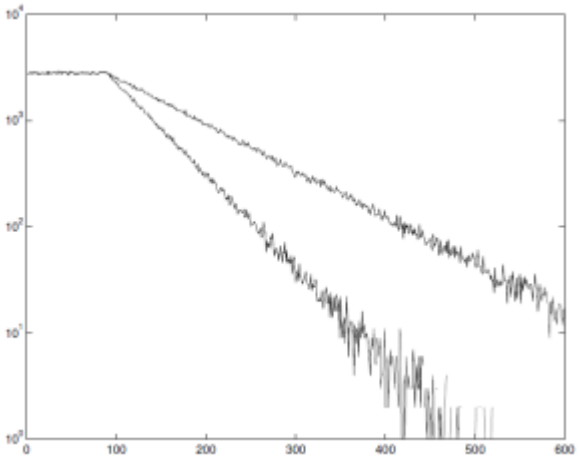

Fig. 1: Logfile logf.png

You will I need the raw data

The timescale is in ns. The plateau is the dead time. The decay slope depends on the count rate.

You can zoom into your data and you will see roughly the same behavior - linear decay after the dead time, which than of course is overshadowed by the background.

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

It can be done measuring in T2 mode and then correlating using the SymPhoTime Software (http://www.picoquant.com/products/sw_mt/sw_mt.htm).

For a trial you will I need the raw data - a pt2 file containing all the photon data - not just the correlated curve. You can record this using the button I highlighted in the attached screenshot.

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