Measuring long lifetimes with DRS4 and QtPALS

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Digital PALS setup with switched capacitors array, based on affordable DRS4 evaluation board and QtPASL[1] software has been used on a daily basis since 2014 in our laboratory. Setup is used mostly for the measurement of metallic samples. In such case, positron annihilation bulk lifetimes are in the area around 100 ps with defect lifetimes around 200 - 400ps. For this measurement time axis within 10 – 20ns is adequate. In other applications, for instance, chemistry [2], longer lifetimes are measured, and the used time axis needs to be longer. For this purpose, DSR4 possibilities with using maximum allowed time widow and lower sampling rates were tested and evaluated. In the process of the long times measurement tests, spectra distortion was observed. Source of this distortion and solution on how to eliminate it will be explained.

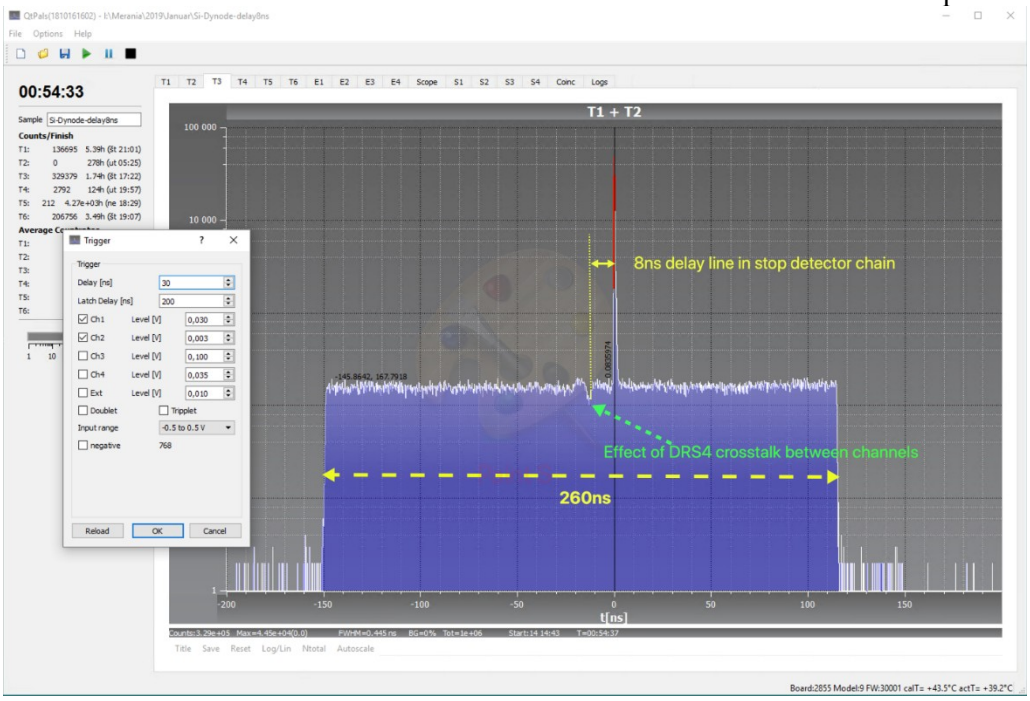

Figure 1 *Maximising of the time axis by latch delay settings in QtPALS and spectra distortion caused by signal crosstalk.*

References

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[2] O. E. Mogensen, *Positron Annihilation in Chemistry*. Berlin, Heidelberg: Springer Berlin Heidelberg, 1995.

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