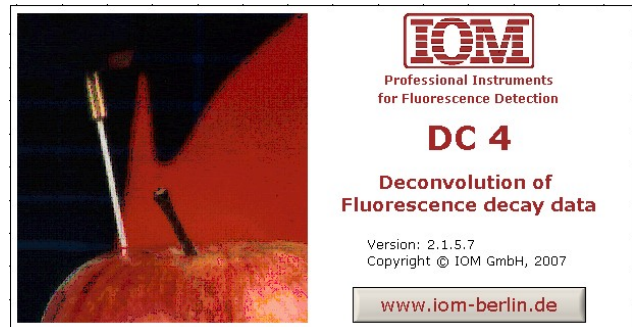


Documentation No. 7

Analysis of fluorescence lifetimes using the deconvolution software DC4



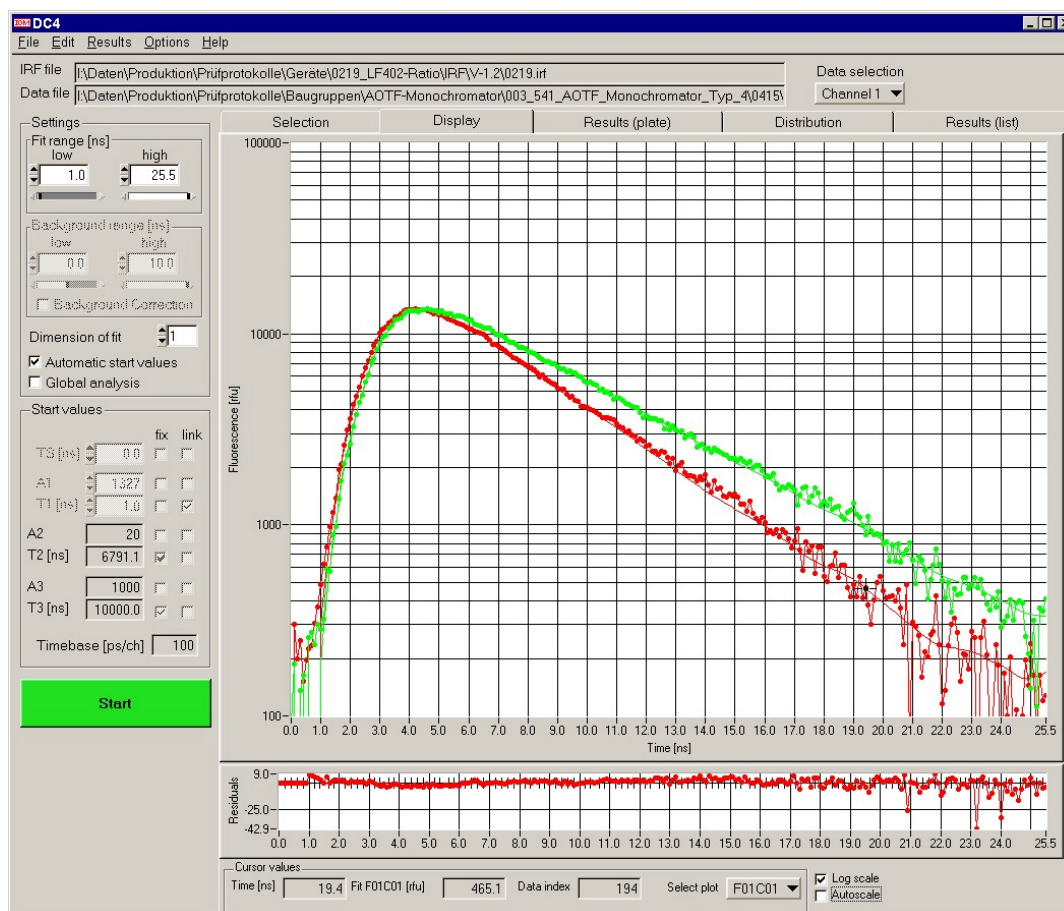
Preconditions:

Fluorescence decay curves measured with
LF401 Lambda,
LF500 NanoScan FLT or
time-correlated single photon counting technique (ASCII format)
known Instrument Response Function (IRF)

Main features of DC4:

- loading and simultaneous analysis of multiple decay curves possible (up to 1536 for a microplate reader experiment)
- analysis of 1, 2 or 3 lifetimes
- display of residuals after curve fit
- automatic determination of start values
- Global analysis by linking of parameters
- coloured graphical display of fluorescence lifetime distribution
- several data and graphics export options

Analysis of single curves



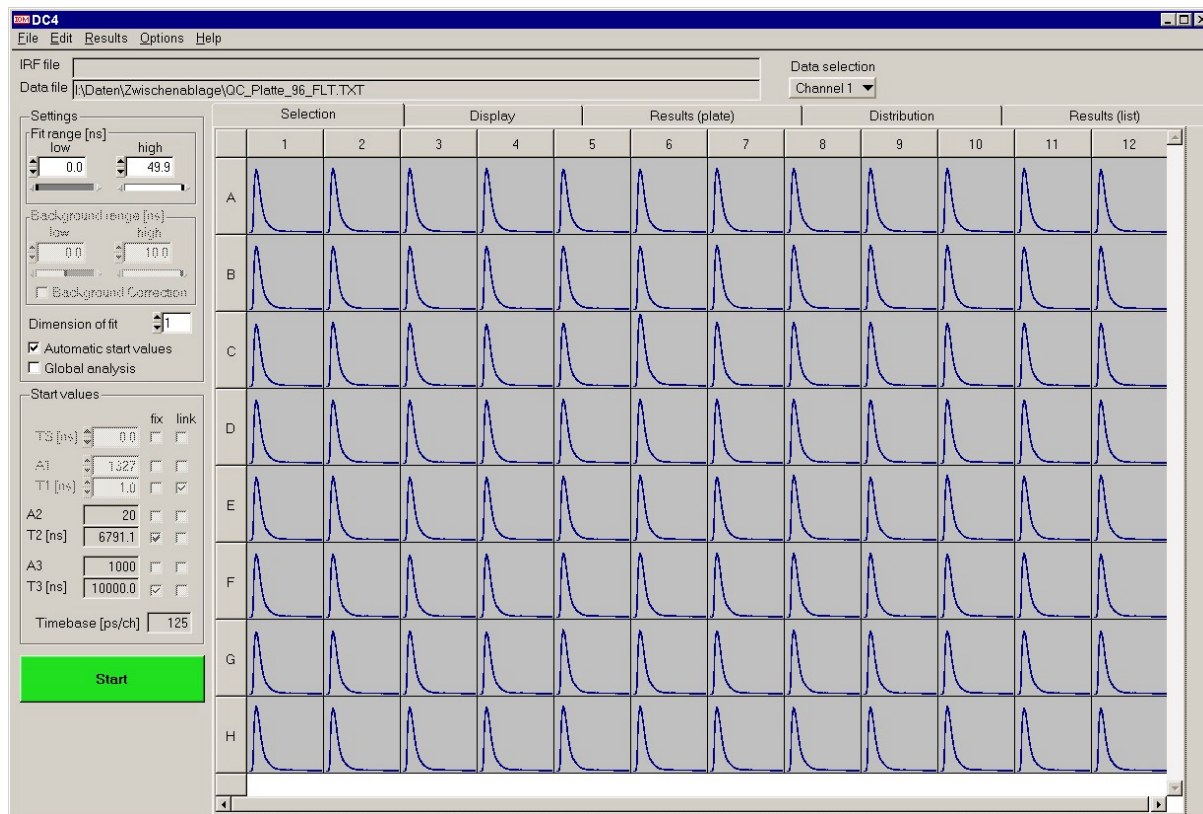
Example of single-exponential analysis of two curves with different lifetimes

$$\tau = 3,44 \text{ ns}$$

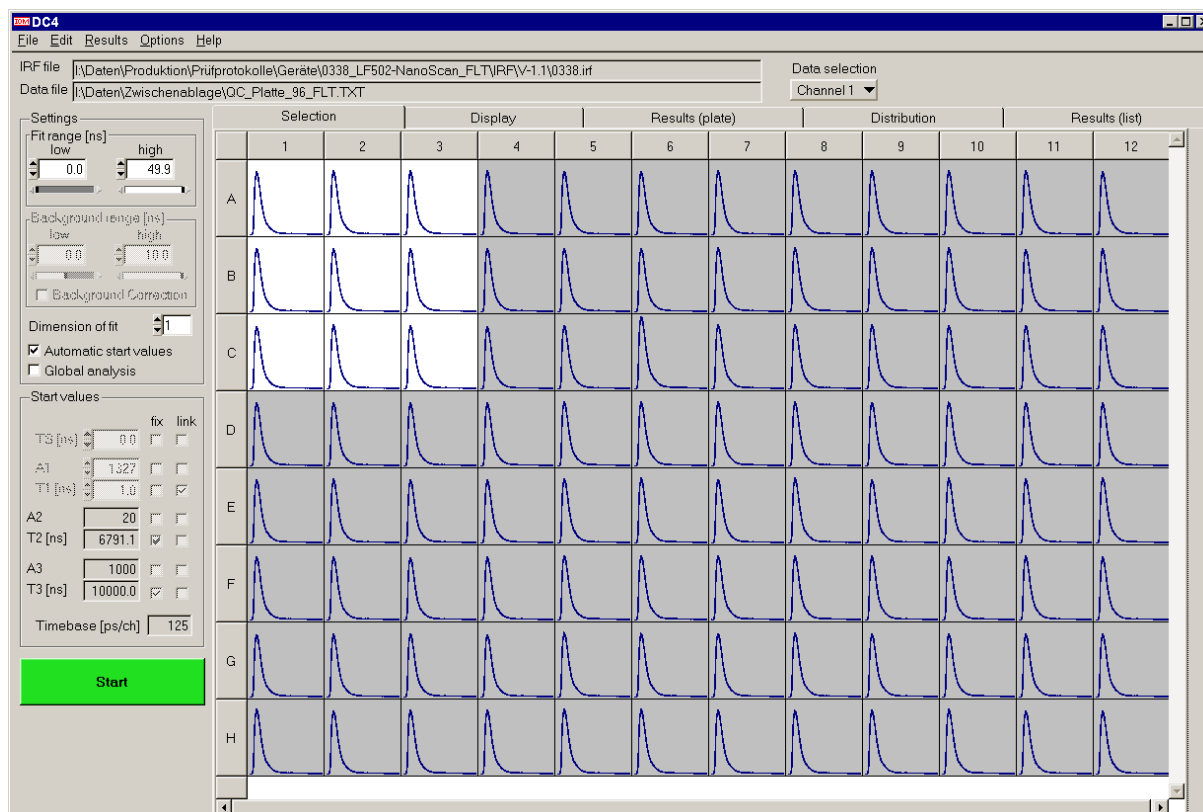
$$\tau = 4,53 \text{ ns}$$

Analysis of multiple curves

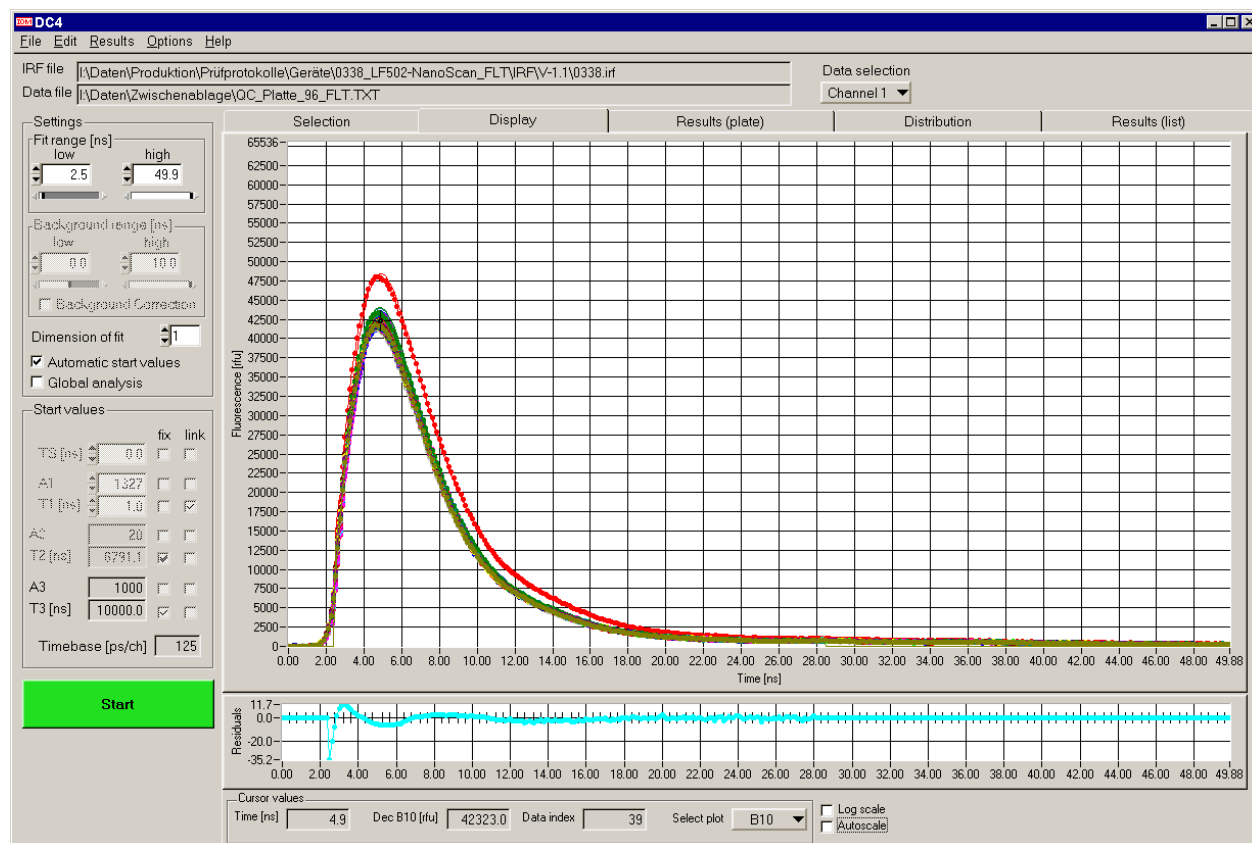
Example: pre-view of 96 decay curves resulting from one 96 well microplate



Select and load a number of curves (example: 9 curves) for data analysis:



Display of all 96 decay curves

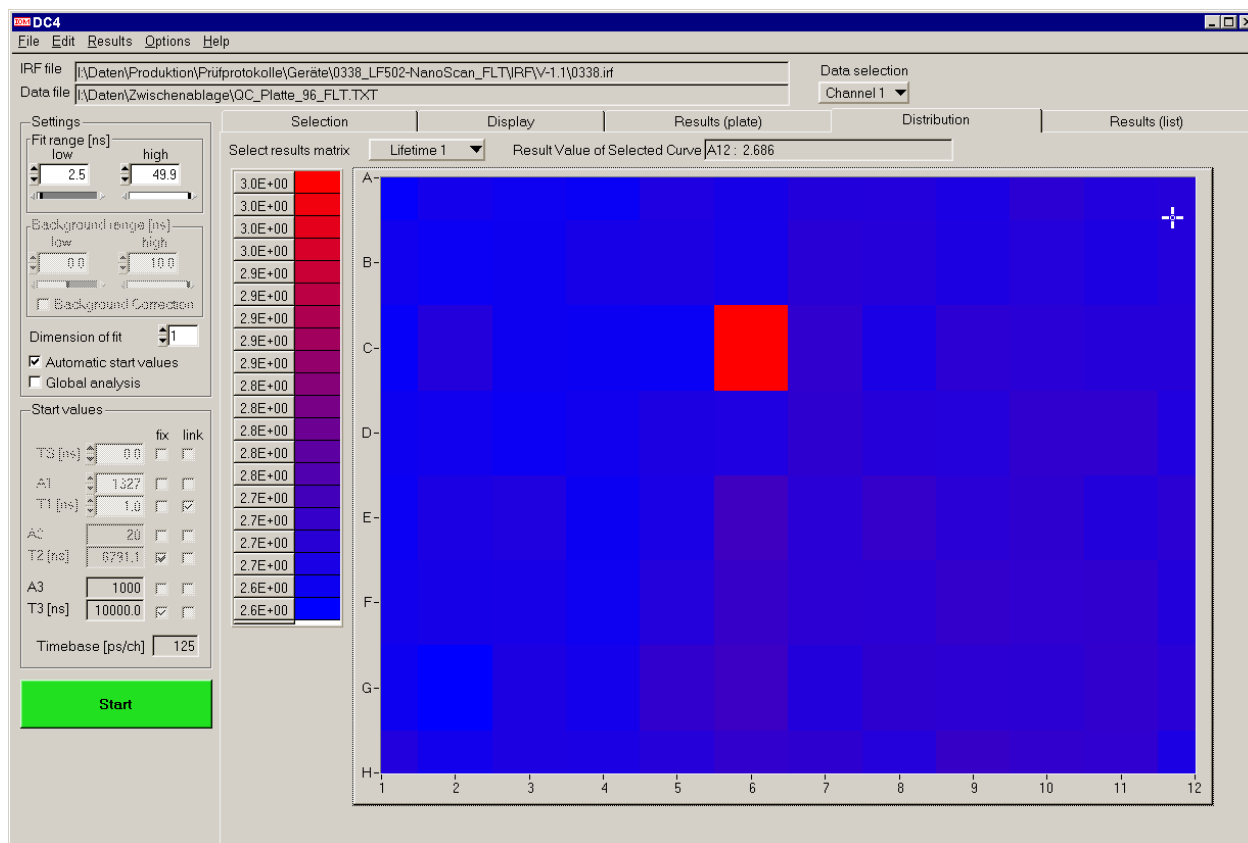


Display of all 96 analysed lifetime values (window: Results)

The screenshot shows the DC4 software interface with the 'Results (list)' tab selected. The 'Select results matrix' is set to 'Lifetime 1'. The table displays lifetime values for 8 samples (A-H) across 12 channels (1-12).

	1	2	3	4	5	6	7	8	9	10	11	12
A	2.634	2.660	2.652	2.642	2.675	2.664	2.683	2.684	2.671	2.694	2.681	2.686
B	2.655	2.645	2.651	2.665	2.672	2.662	2.691	2.688	2.675	2.685	2.673	2.683
C	2.638	2.684	2.650	2.647	2.642	3.022	2.703	2.670	2.696	2.692	2.687	2.687
D	2.648	2.655	2.645	2.656	2.673	2.675	2.699	2.689	2.686	2.703	2.703	2.679
E	2.646	2.672	2.677	2.647	2.668	2.726	2.692	2.710	2.692	2.700	2.682	2.695
F	2.657	2.663	2.666	2.651	2.685	2.713	2.697	2.694	2.708	2.701	2.703	2.682
G	2.649	2.629	2.673	2.660	2.705	2.719	2.681	2.700	2.696	2.695	2.704	2.692
H	2.681	2.657	2.674	2.670	2.686	2.705	2.699	2.685	2.714	2.706	2.701	2.671

Graphical display of fluorescence lifetime distribution (window: Distribution)



Conclusion:

- The DC4 software package is a valuable tool for the analysis of single and multiple fluorescence decay curves.