

## Supporting Information

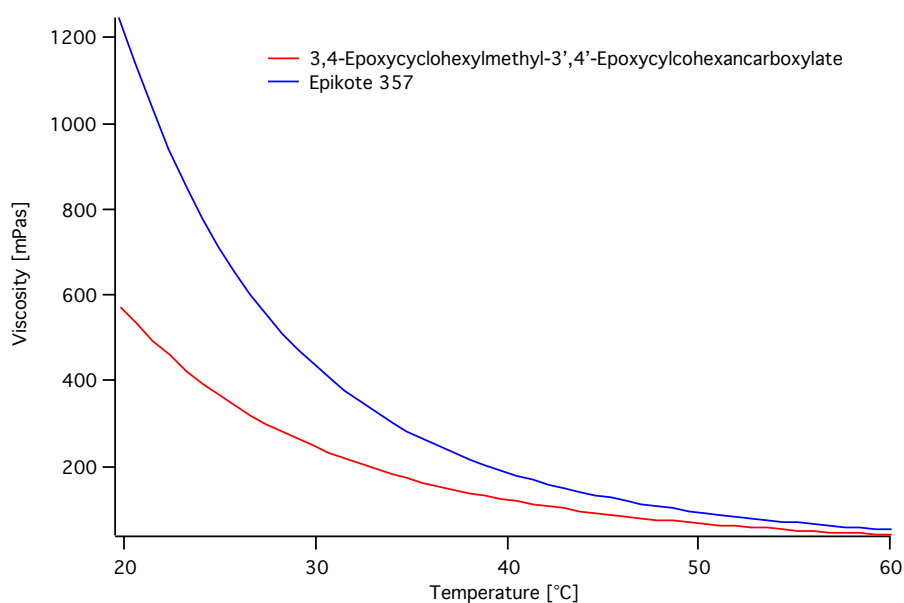


Fig. SI1. Dynamic Viscosity of 3,4-Epoxy cyclohexylmethyl-3',4'-Epoxy cyclohexancarboxylate and Epikote 357 measured with MRC 102 Rheometer by Anton Paar with a Cone Plate Geometry at  $50 \text{ s}^{-1}$

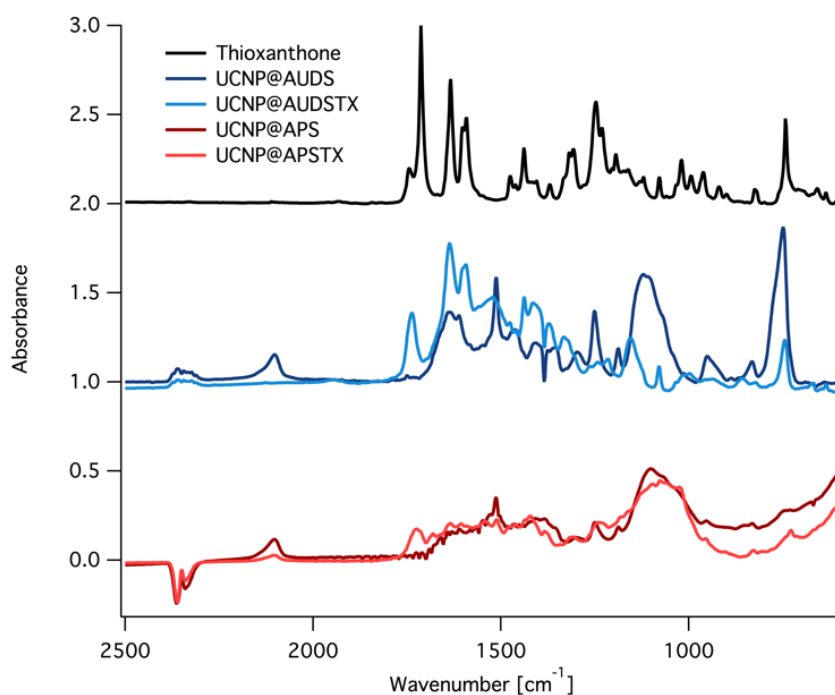


Fig. SI2 FTIR Spectra of the Modified UCNPs before and after the binding of the PI on the particle surface measured in a KBr pellet with 1% of the respective sample in transmission using a Vertex 70 from Bruker

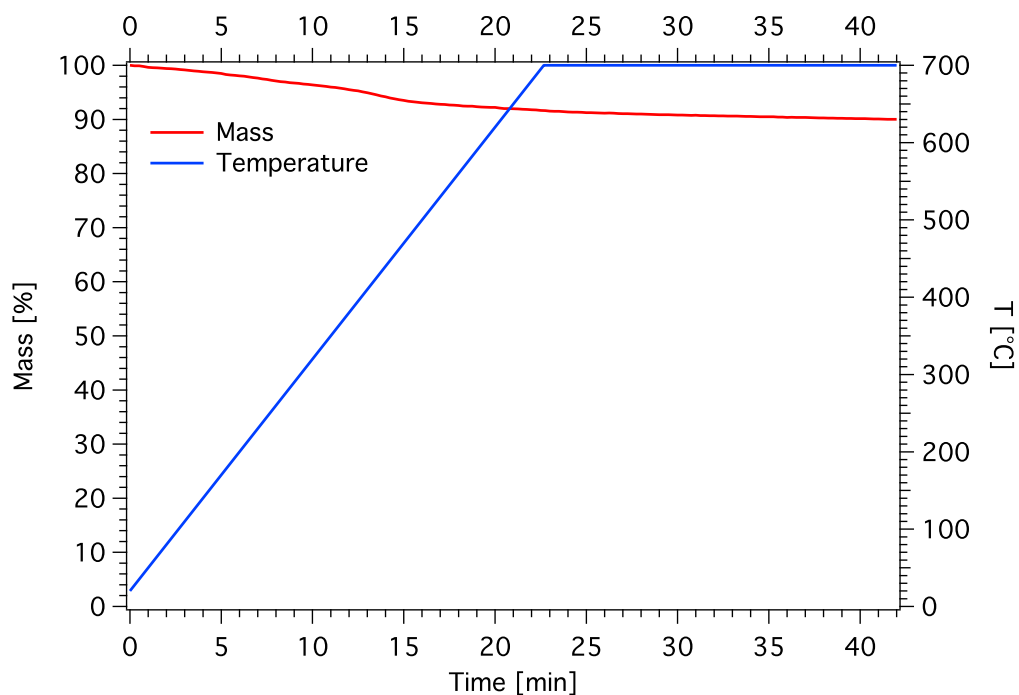


Figure S13: Mass loss of UCNP@AUDSTX determined by TGA. Heating range: 30  $\text{K}\cdot\text{min}^{-1}$ , starting temperature: 22  $^{\circ}\text{C}$ , final temperature: 700  $^{\circ}\text{C}$ .

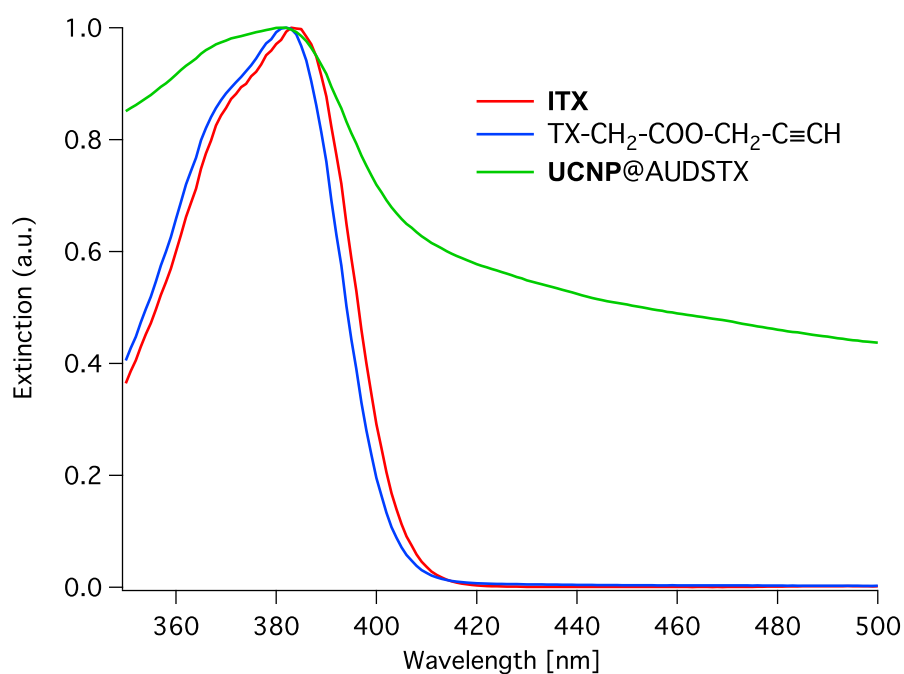
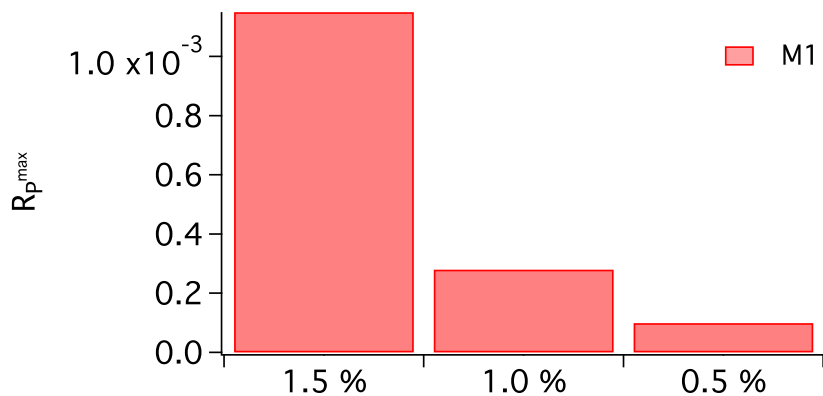
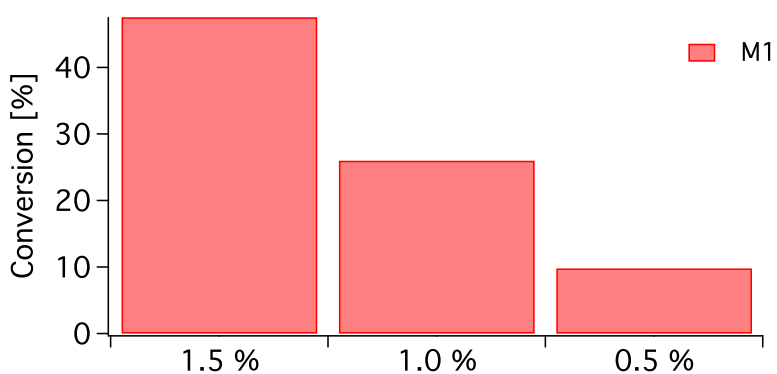


Fig. S14. Absorption spectra of **ITX**, TX-CH<sub>2</sub>-COO-CH<sub>2</sub>-C≡CH and **UCNP@AUDSTX** in CH<sub>3</sub>CN.



a)



b)

Fig. SI5. Influence of **IS-PF6** concentration of reactivity of photopolymerization as compared by a) the polymerization rate  $R_p^{\max}$  and conversion of epoxide groups in the monomer **M1**. Experimental conditions equivalent with those shown in Figure 5 and 6, respectively.

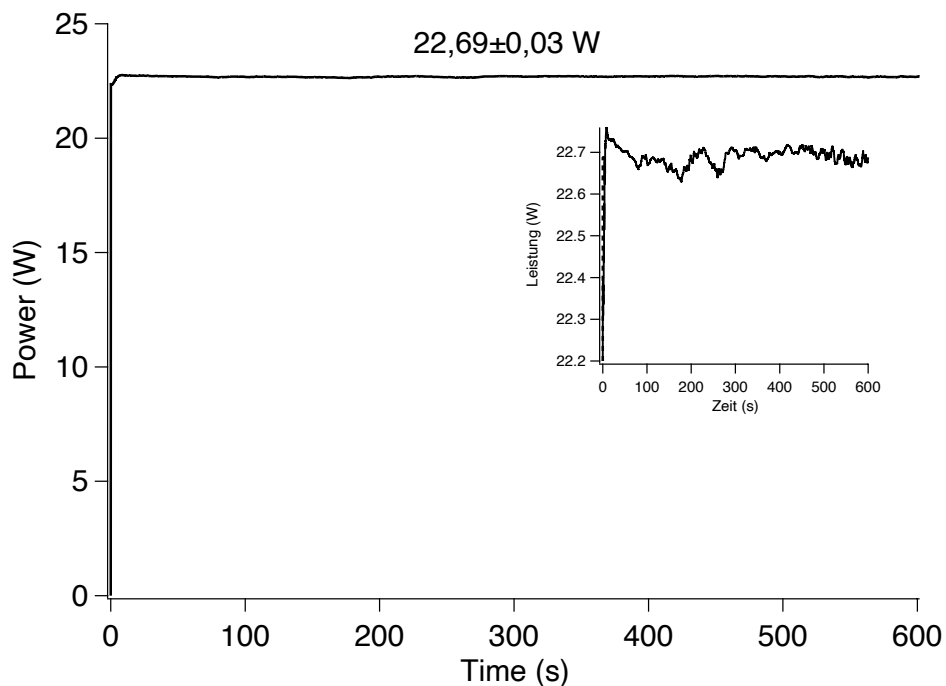


Figure SI6. Output power of the NIR laser as a function of time. Inset: close up of the output power. Exposure of the sample with this condition leads to high temperatures and an evaporation of the solvent.

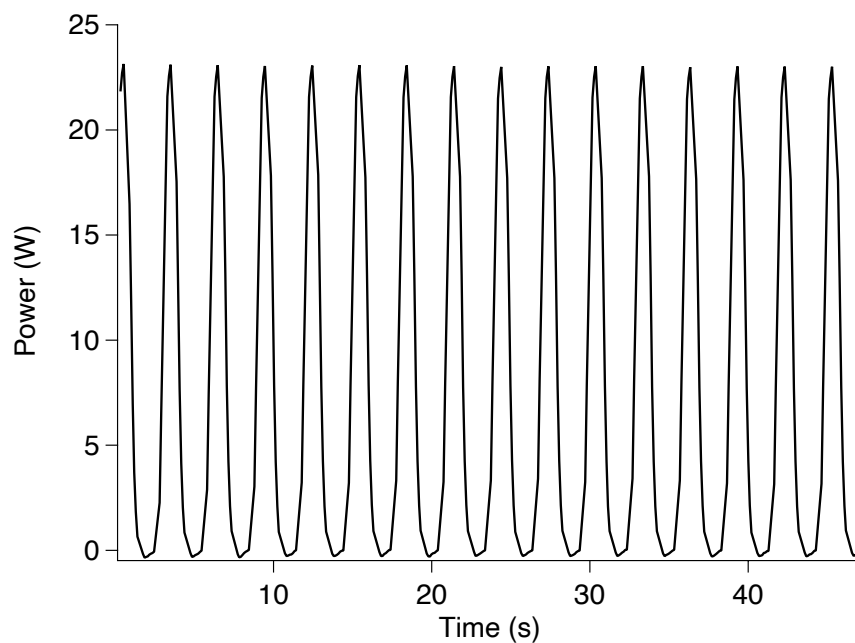
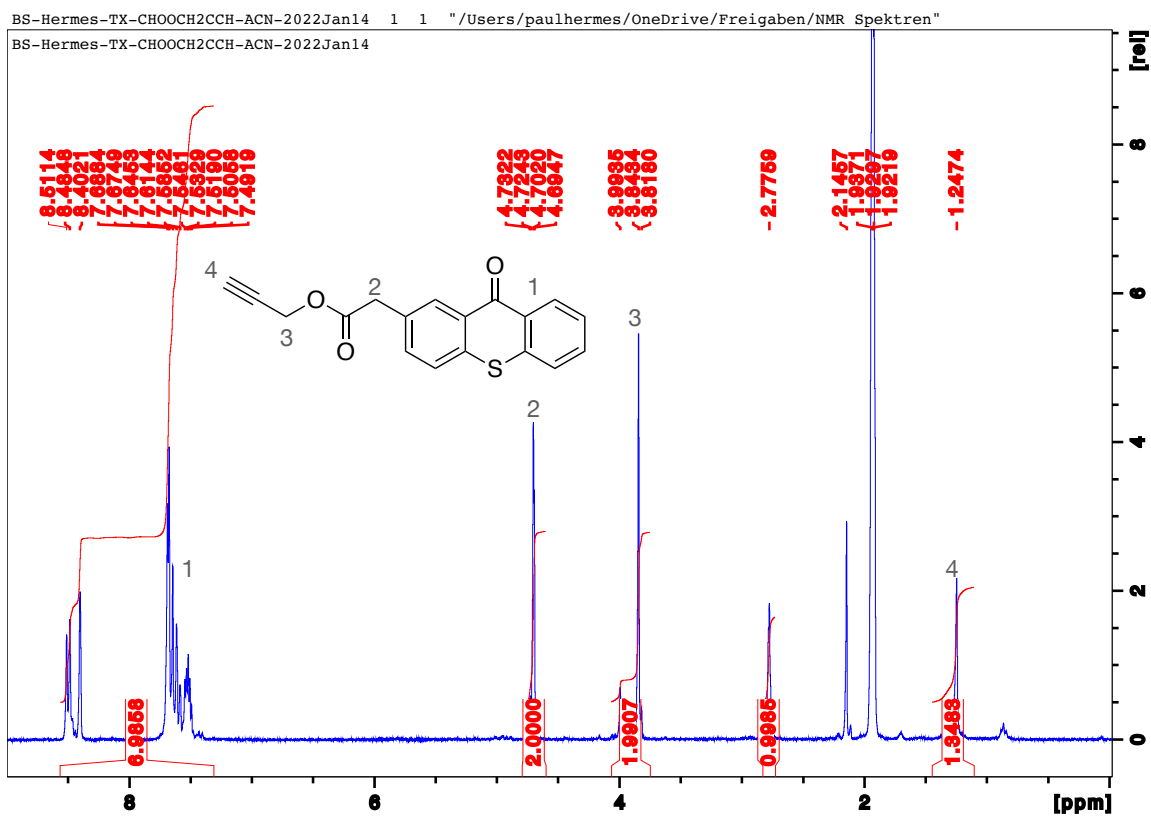


Fig. SI7. Output power of the NIR laser after modifying with a microcontroller board. Each cycle reaches the maximum value of the laser after switching on. This leads to less heating of the sample.



### Fluorescence measurements

Measurements were conducted as described in Ref.[1] using software from PicoQuant to control the measurement. One referee requested these experiments to get more information about possibly proceeding Förster-Energy-Transfer. Measurements indicated short emission decay time due to effective ISC process. Fluorescence spectra take complement these findings. A diode laser emitting at 376 nm served as excitation source. Optical density of the solutions comprising the **TX** compound was lower than 0.2

- [1] Q. Wang, S. Popov, A. Feilen, V. Strehmel, B. Strehmel, "Rational Selection of Cyanines to Generate Conjugate Acid and Free Radicals for Photopolymerization upon Exposure at 860 nm" *Angewandte Chemie International Edition* **2021**, *60*, 26855-26865.

# EasyTau Report

6/14/2022 3:38:39 PM



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## Container Curves

Decay+IRF\_20220614\_1523.etc: crv[0 - 1]

## Container Properties

Measurement Context: Decay

Summary:

Sample:	2022-06-14-ITX
Solvent:	Acetonitrile
Excitation:	V pol 376±1nm with LDH-P-C-375
Detection:	U pol 430±3nm 10000 peak counts grating 1200/500+ detector UV-red [PMT]

## Comment

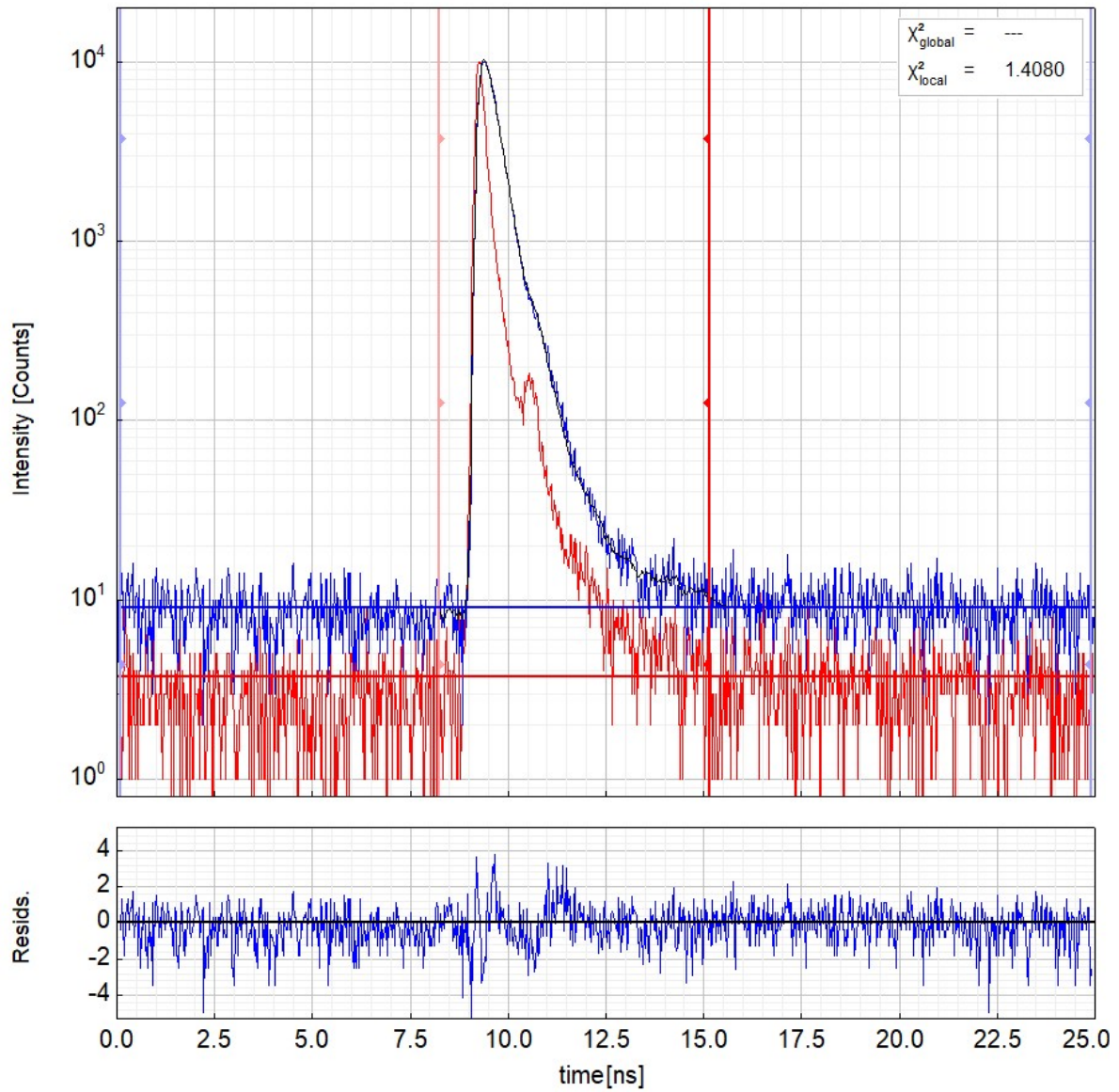
[\[Edit Comment\]](#)

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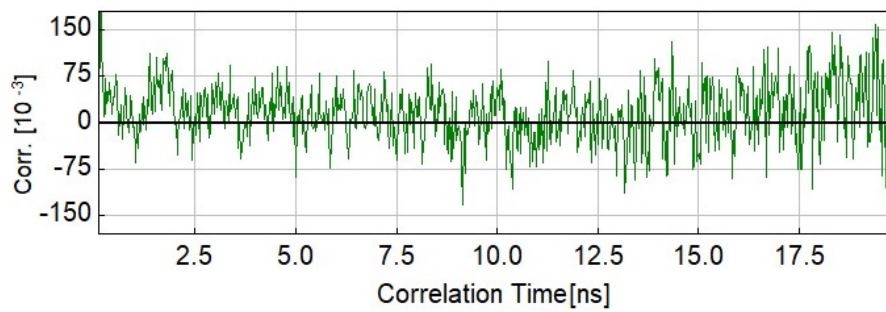
# Data Set: 1 / 1

Decay: crv[1]; IRF: crv[0]

Fit



Autocorrelation (Residuals)





Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	25.78	$\pm 0.33$	1.3%
$\tau_1$ [ns]	0.2492	$\pm 0.0016$	0.6%
$I_1$ [kCnts]	256.9	$\pm 1.4$	0.5%
$Bkg_{Dec}$ [kCnts]	0.0091	$\pm 0.0002$	1.5%
$Bkg_{IRF}$ [Cnts/Chnl]	3.71	$\pm 0.24$	6.3%
$Shift_{IRF}$ [ps]	-50.02	$\pm 0.57$	1.1%
$T_{AvInt}$ [ns]	0.2492	$\pm 0.0016$	0.6%
$T_{AvAmp}$ [ns]	0.2492	$\pm 0.0016$	0.6%

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# EasyTau Report

6/14/2022 3:39:58 PM



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## Container Curves

Decay+IRF\_20220614\_1529.etc: crv[0 - 1]

## Container Properties

Measurement Context: Decay

Summary:

Sample:	2022-06-14-ITX
Solvent:	Acetonitrile
Excitation:	V pol 376±1nm with LDH-P-C-375
Detection:	U pol 465±3nm 10000 peak counts grating 1200/500+ detector UV-red [PMT]

## Comment

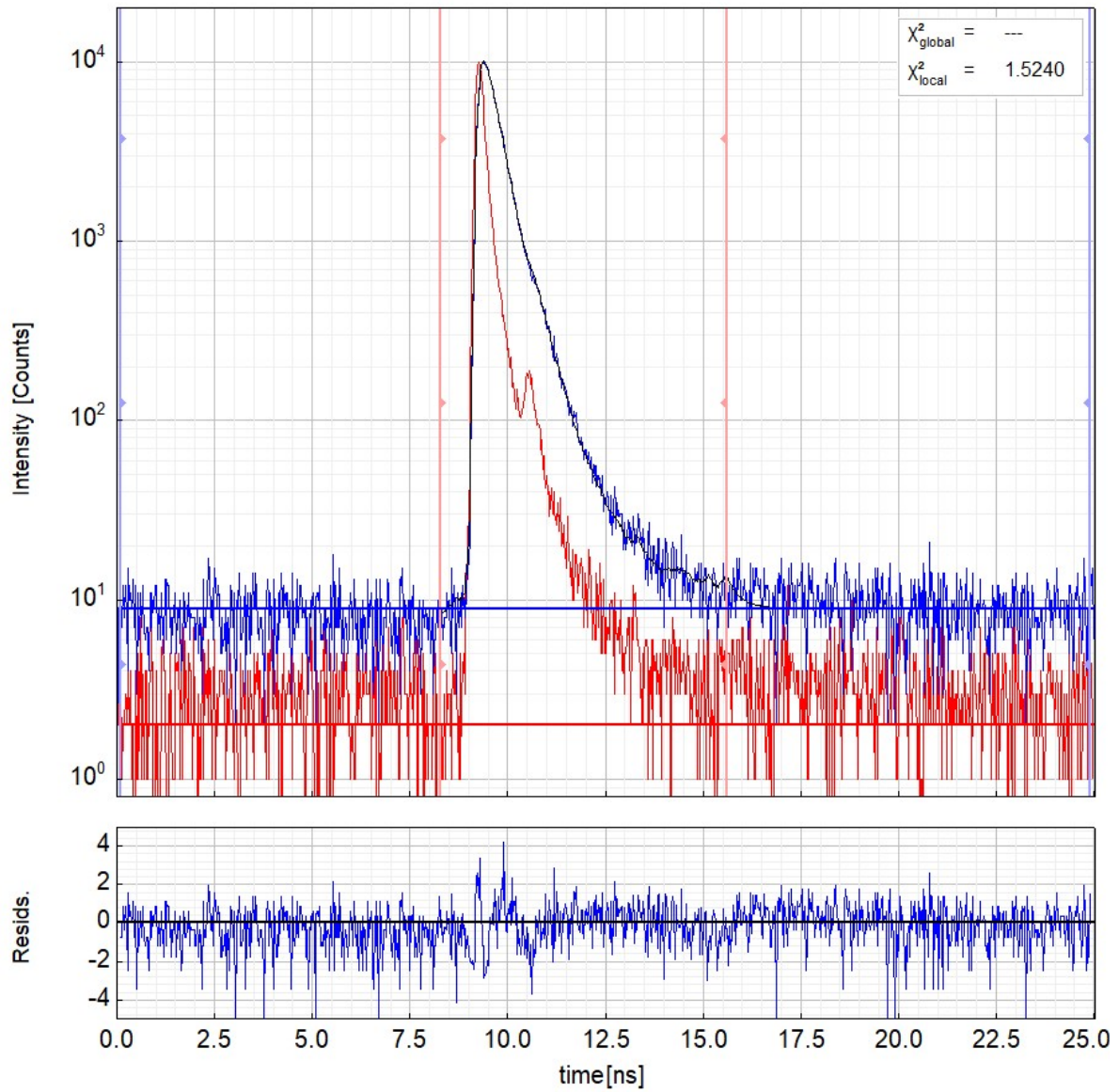
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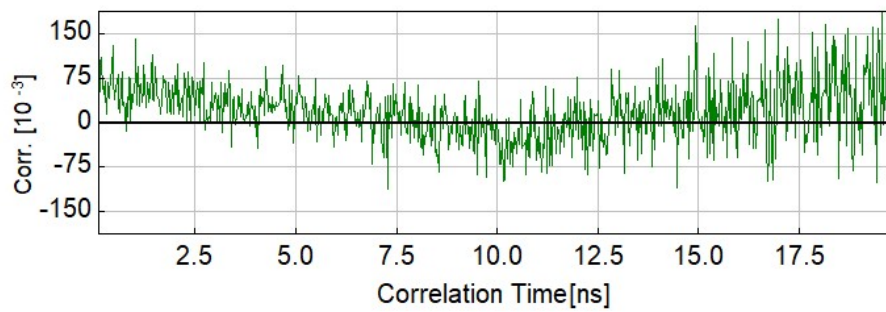
# Data Set: 1 / 1

Decay: crv[1]; IRF: crv[0]

Fit



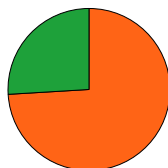
Autocorrelation (Residuals)



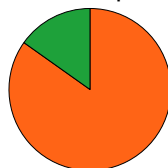
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	20.64	$\pm 0.41$	2.0%
$\tau_1$ [ns]	0.2491	---	---
$I_1$ [kCnts]	205.6	$\pm 4.1$	2.0%
$A_2$ [kCnts/Chnl]	3.70	$\pm 0.20$	5.3%
$\tau_2$ [ns]	0.4880	$\pm 0.0086$	1.7%
$I_2$ [kCnts]	72.1	$\pm 3.4$	4.6%
Bkg <sub>rDec</sub> [kCnts]	0.0090	$\pm 0.0001$	0.7%
Bkg <sub>rIRF</sub> [Cnts/Chnl]	2.02	$\pm 0.13$	6.2%
Shift <sub>rIRF</sub> [ps]	-52.4	$\pm 1.2$	2.1%
$\tau_{AvInt}$ [ns]	0.3112	$\pm 0.0020$	0.6%
$\tau_{AvAmp}$ [ns]	0.2854	$\pm 0.0015$	0.5%

Relative Intensities



Relative Amplitudes



# EasyTau Report

6/14/2022 3:00:01 PM



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## Container Curves

Decay+IRF\_20220614\_1450.etc: crv[0 - 1]

## Container Properties

Measurement Context: Decay

Summary:

Sample:	2022-06-14-TXCH <sub>2</sub> COOCH <sub>2</sub> CCH
Solvent:	Acetonitrile
Excitation:	V pol 376±1nm with LDH-P-C-375
Detection:	U pol 430±3nm 10000 peak counts grating 1200/500+ detector UV-red [PMT]

## Comment

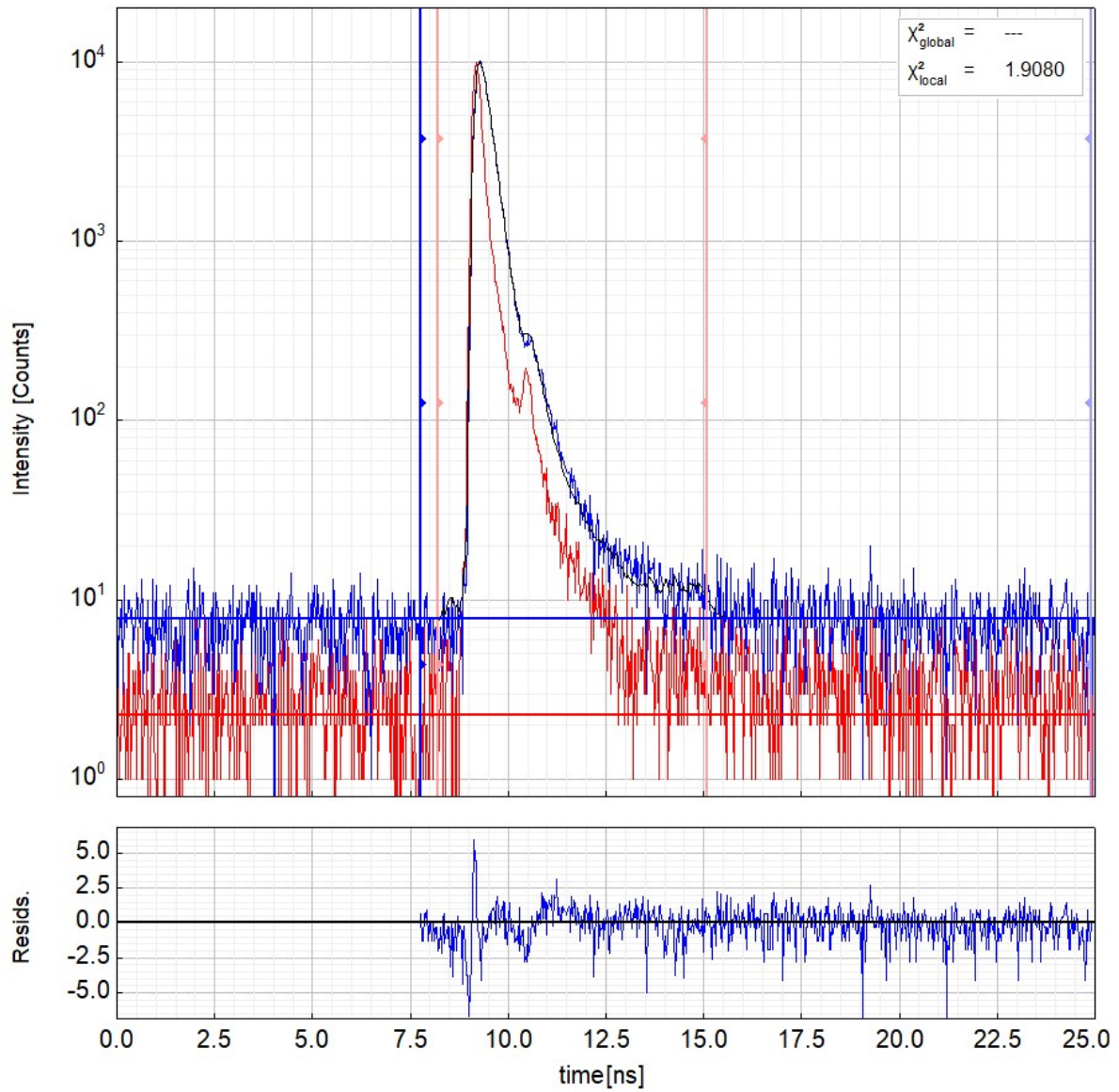
[\[Edit Comment\]](#)

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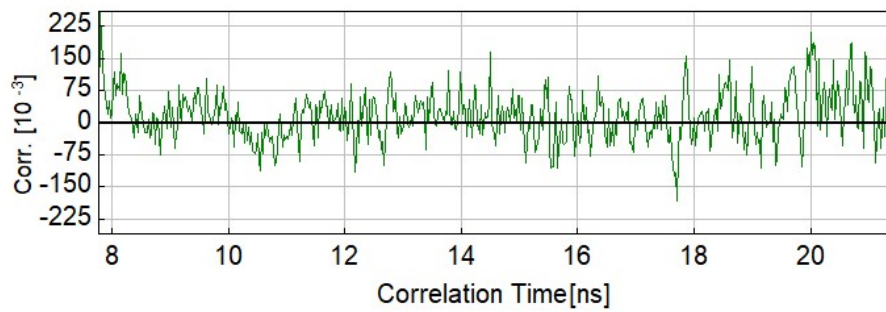
# Data Set: 1 / 1

Decay: crv[1]; IRF: crv[0]

Fit



Autocorrelation (Residuals)



Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	31.02	$\pm 0.41$	1.3%
$\tau_1$ [ns]	0.1745	$\pm 0.0013$	0.7%
$I_1$ [kCnts]	216.5	$\pm 1.2$	0.5%
$Bkg_{Dec}$ [kCnts]	0.0079	$\pm 0.0002$	1.3%
$Bkg_{IRF}$ [Cnts/Chnl]	2.29	$\pm 0.33$	14%
$Shift_{IRF}$ [ps]	-53.7	$\pm 1.4$	2.4%
$T_{AvInt}$ [ns]	0.1745	$\pm 0.0013$	0.7%
$T_{AvAmp}$ [ns]	0.1745	$\pm 0.0013$	0.7%

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# EasyTau Report

6/14/2022 3:00:46 PM



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## Container Curves

Decay+IRF\_20220614\_1454.etc: crv[0 - 1]

## Container Properties

Measurement Context: Decay

Summary:

Sample:	2022-06-14-TXCH <sub>2</sub> COOCH <sub>2</sub> CCH
Solvent:	Acetonitrile
Excitation:	V pol 376±1nm with LDH-P-C-375
Detection:	U pol 465±3nm 10000 peak counts grating 1200/500+ detector UV-red [PMT]

## Comment

[\[Edit Comment\]](#)

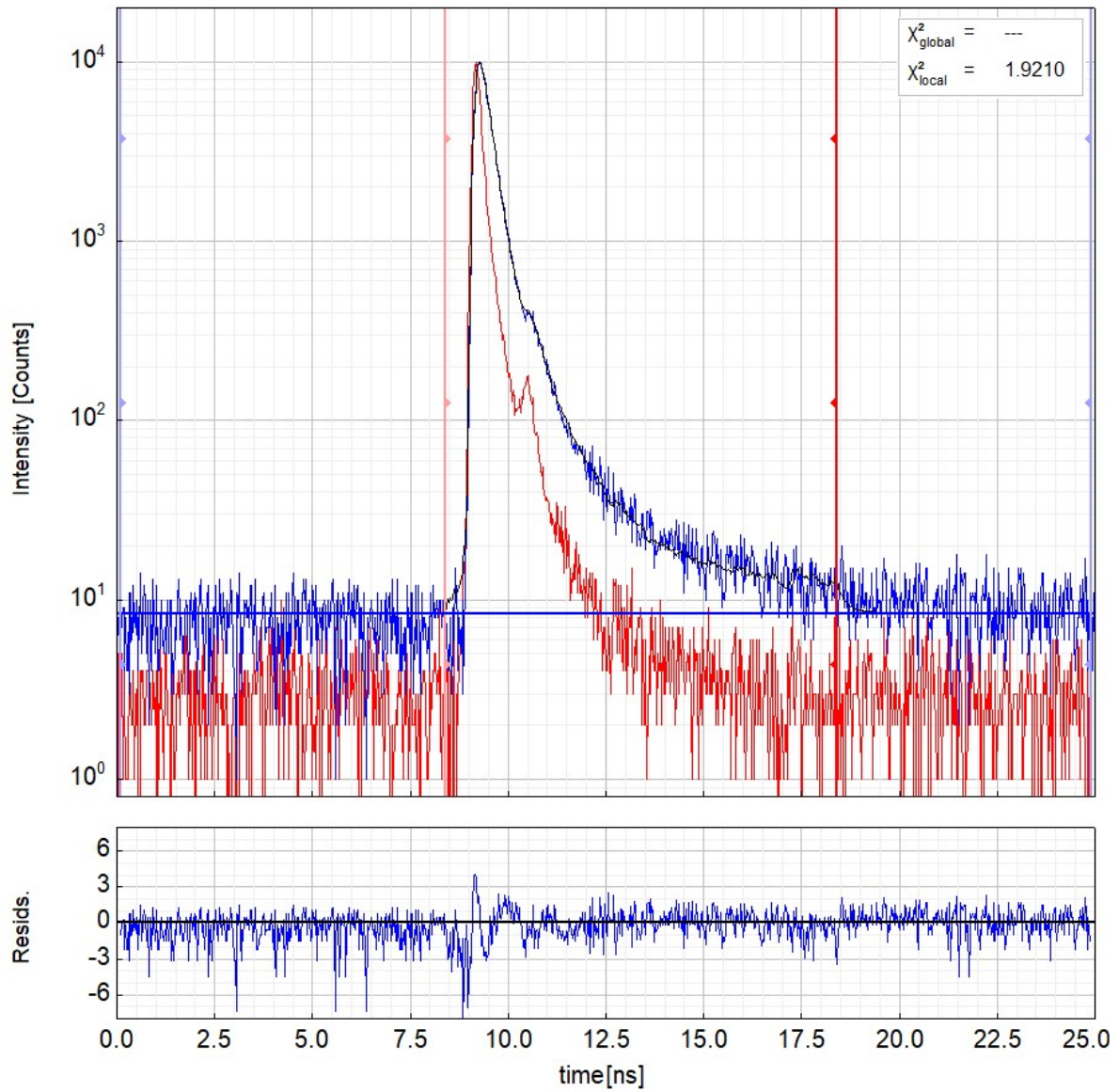
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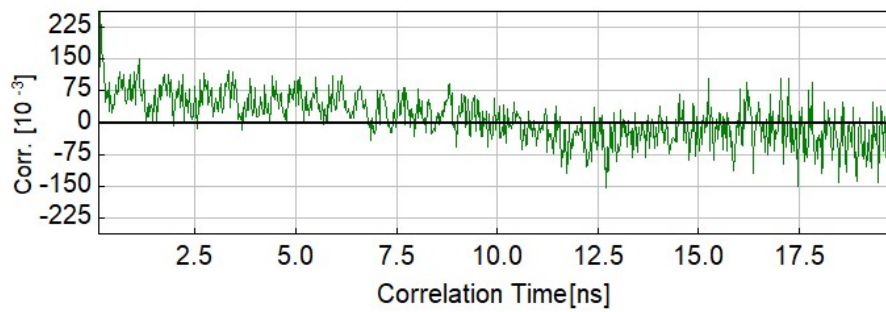
# Data Set: 1 / 1

Decay: crv[1]; IRF: crv[0]

Fit



Autocorrelation (Residuals)



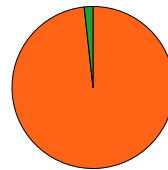
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	29.27	$\pm 0.30$	1.0%
$\tau_1$ [ns]	0.1745	---	---
$I_1$ [kCnts]	204.3	$\pm 2.1$	1.0%
$A_2$ [kCnts/Chnl]	0.519	$\pm 0.030$	5.8%
$\tau_2$ [ns]	0.917	$\pm 0.018$	1.9%
$I_2$ [kCnts]	19.03	$\pm 0.72$	3.8%
$Bkg_{Dec}$ [kCnts]	0.0084	$\pm 0.0001$	0.9%
$Bkg_{IRF}$ [Cnts/Chnl]	0.44	$\pm 0.16$	36%
$Shift_{IRF}$ [ps]	-74.58	$\pm 0.36$	0.5%
$\tau_{AvInt}$ [ns]	0.2378	$\pm 0.0024$	1.0%
$\tau_{AvAmp}$ [ns]	0.1875	$\pm 0.0006$	0.3%

Relative Intensities



Relative Amplitudes



# EasyTau Report

6/13/2022 2:00:14 PM

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## Container Curves

Decay+IRF\_20220531\_1300.etc: crv[0 - 1]

## Container Properties

Measurement Context: Decay

Summary:

Sample:	2022-05-31-UCNP@AUDSTX
Solvent:	Acetonitrile
Excitation:	V pol 376±1nm with LDH-P-C-375
Detection:	U pol 480±3nm 10000 peak counts grating 1200/500+ detector UV-red [PMT]

## Comment

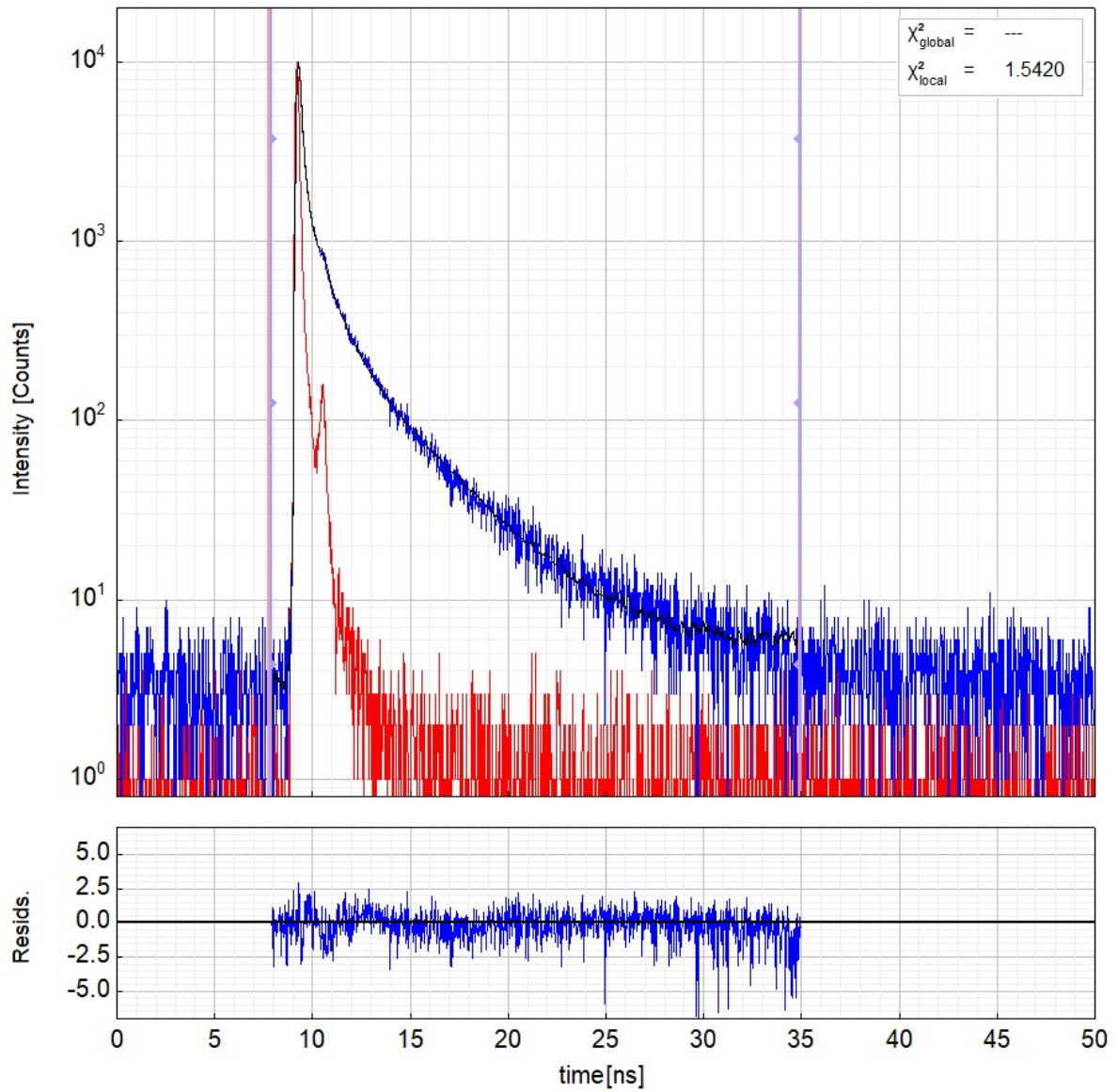
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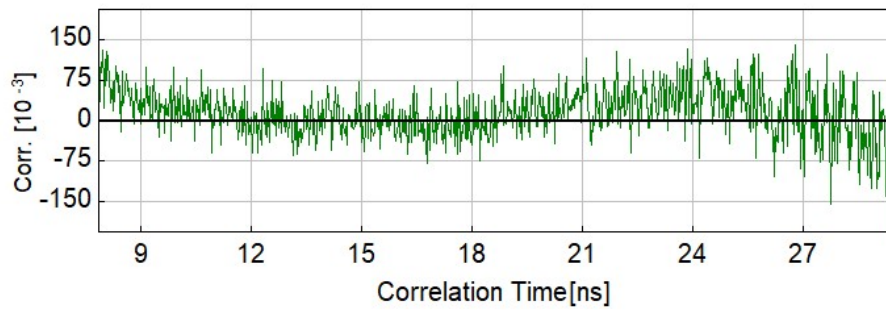
# Data Set: 1 / 1

Decay: crv[1]; IRF: crv[0]

Fit



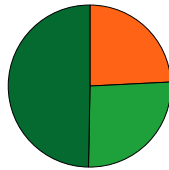
Autocorrelation (Residuals)



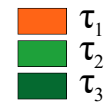
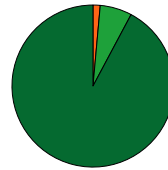
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	0.422	$\pm 0.041$	9.5%
$\tau_1$ [ns]	3.53	$\pm 0.14$	3.7%
$I_1$ [kCnts]	59.5	$\pm 3.1$	5.1%
$A_2$ [kCnts/Chnl]	1.87	$\pm 0.13$	6.9%
$\tau_2$ [ns]	0.858	$\pm 0.079$	9.1%
$I_2$ [kCnts]	64.13	$\pm 0.99$	1.5%
$A_3$ [kCnts/Chnl]	27.2	$\pm 1.8$	6.6%
$\tau_3$ [ns]	0.1128	$\pm 0.0062$	5.4%
$I_3$ [kCnts]	122.2	$\pm 4.8$	3.9%
$Bkgr_{Dec}$ [kCnts]	0.0004	$\pm 0.0008$	214%
$Bkgr_{IRF}$ [Cnts/Chnl]	-1.16	$\pm 0.38$	33%
$Shift_{IRF}$ [ps]	-27.7	$\pm 1.7$	6.0%
$A_{Scatt}$ [kCnts]	5.3	$\pm 3.6$	67%
$\tau_{AvInt}$ [ns]	1.134	$\pm 0.030$	2.6%
$\tau_{AvAmp}$ [ns]	0.2091	$\pm 0.0097$	4.6%

Relative Intensities



Relative Amplitudes



# EasyTau Report

6/13/2022 2:01:16 PM



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## Container Curves

## Container Properties

Measurement Context: Decay

Summary:

Sample: 2022-05-31-UCNP@AUDSTX  
Solvent: Acetonitrile  
Excitation: V pol 376±1nm with LDH-P-C-375  
Detection: U pol 600±14nm 100000 peak counts  
grating 1200/500+  
detector UV-red [PMT]

## Comment

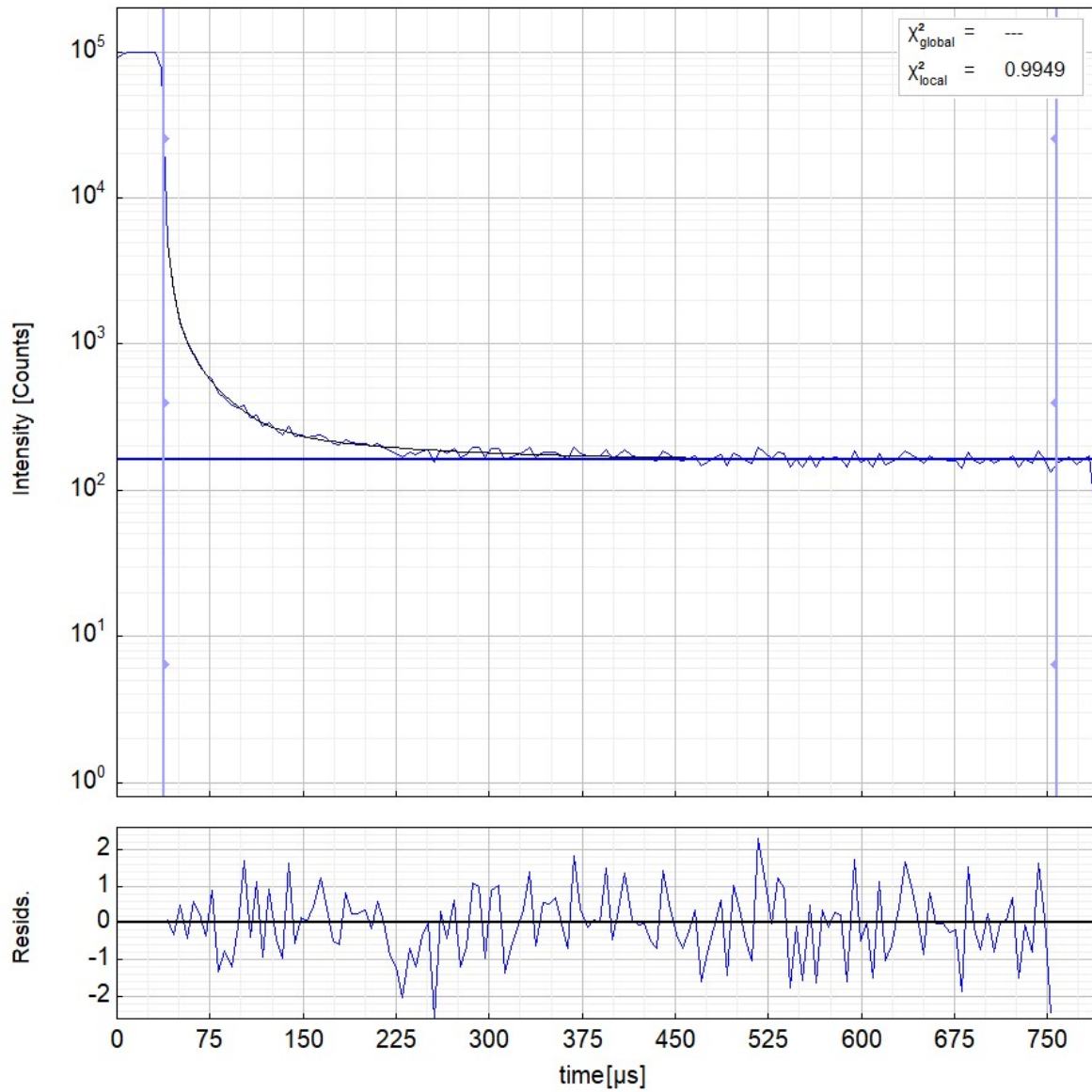
[\[Edit Comment\]](#)

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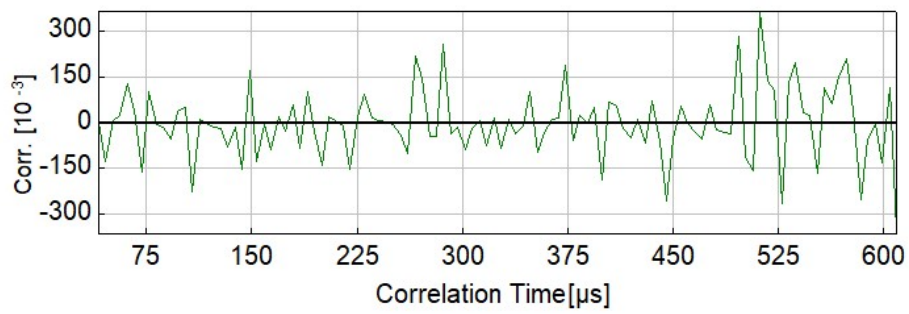
# Data Set: 1 / 1

Decay: crv[0]; IRF: ---

Fit



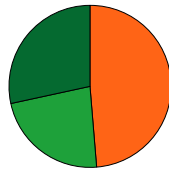
Autocorrelation (Residuals)



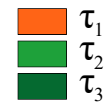
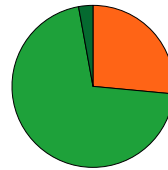
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	1.25	$\pm 0.24$	19%
$\tau_1$ [ns]	24 400	$\pm 6 300$	25%
$I_1$ [kCnts]	5.92	$\pm 0.55$	9.1%
$A_2$ [kCnts/Chnl]	3.32	$\pm 0.23$	6.7%
$\tau_2$ [ns]	4 300	$\pm 980$	23%
$I_2$ [kCnts]	2.79	$\pm 0.79$	28%
$A_3$ [kCnts/Chnl]	0.135	$\pm 0.067$	50%
$\tau_3$ [ns]	132 000	$\pm 76 000$	57%
$I_3$ [kCnts]	3.46	$\pm 0.43$	12%
Bkgr <sub>Dec</sub> [kCnts]	0.1611	$\pm 0.0058$	3.6%
$\tau_{AvInt}$ [ns]	51 000	$\pm 25 000$	50%
$\tau_{AvAmp}$ [ns]	13 300	$\pm 1 700$	13%

Relative Intensities



Relative Amplitudes





# EasyTau Report

6/13/2022 2:02:39 PM



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## Container Curves

Decay+IRF\_20220531\_1532.etc: crv[0 - 1]

## Container Properties

Measurement Context: Decay

Summary:

Sample:	2022-05-31-UCNP@AUDSTX
Solvent:	Acetonitrile
Excitation:	V pol 376±1nm with LDH-P-C-375
Detection:	U pol 600±14nm 10000 peak counts grating 1200/500+ detector UV-red [PMT]

## Comment

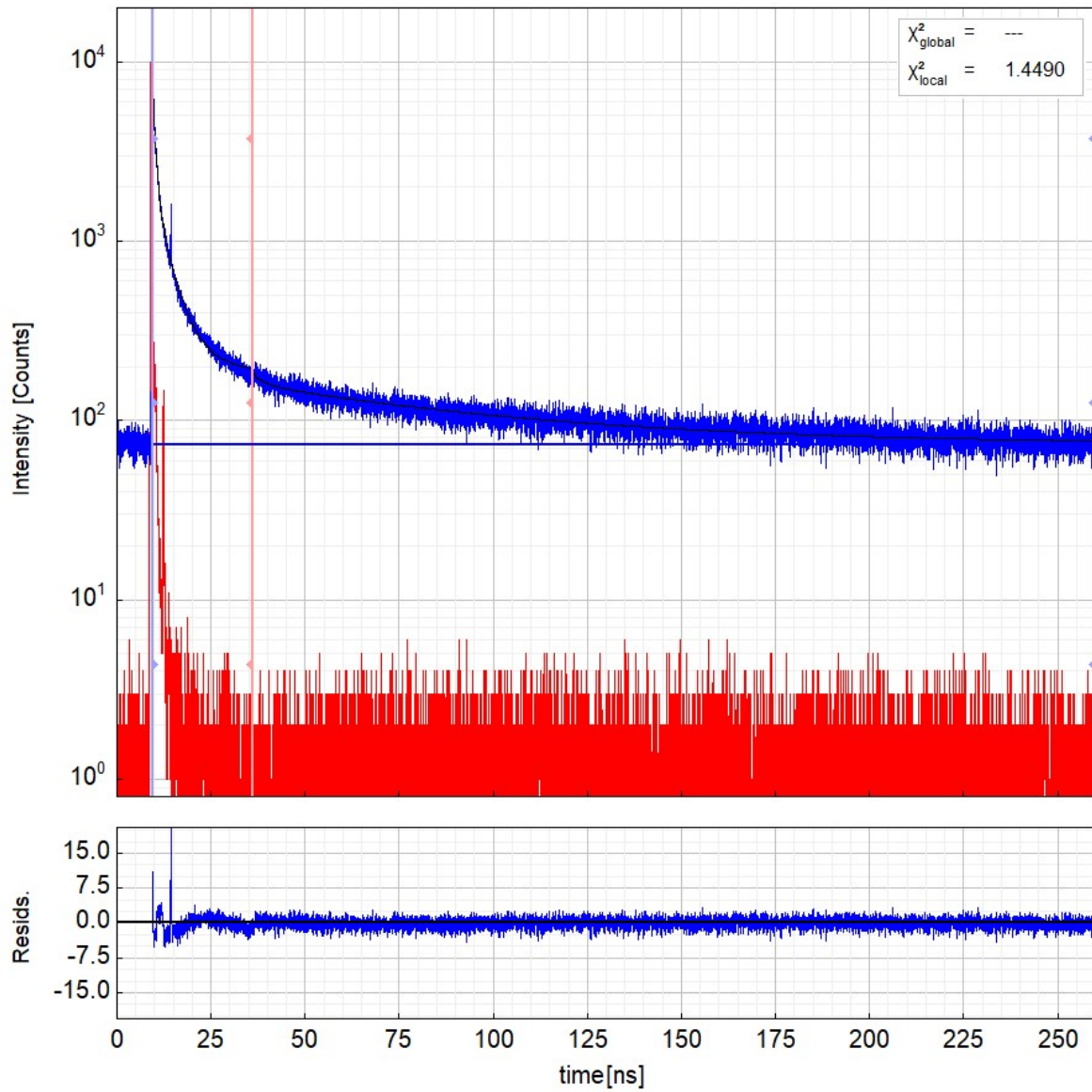
[\[Edit Comment\]](#)

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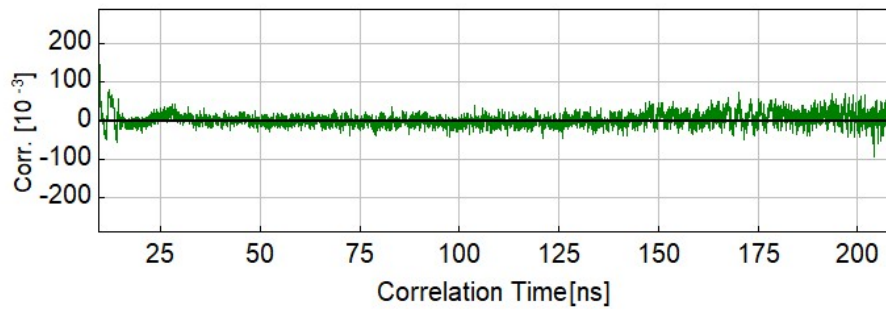
# Data Set: 1 / 1

Decay: crv[1]; IRF: crv[0]

Fit



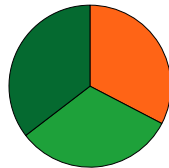
Autocorrelation (Residuals)



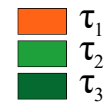
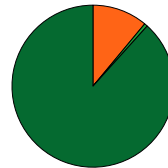
Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	2.035	$\pm 0.070$	3.4%
$\tau_1$ [ns]	4.009	$\pm 0.100$	2.5%
$I_1$ [kCnts]	326.3	$\pm 6.5$	2.0%
$A_2$ [kCnts/Chnl]	0.1179	$\pm 0.0020$	1.6%
$\tau_2$ [ns]	67.8	$\pm 1.1$	1.6%
$I_2$ [kCnts]	319.5	$\pm 5.1$	1.6%
$A_3$ [kCnts/Chnl]	16.3	$\pm 1.2$	6.9%
$\tau_3$ [ns]	0.544	$\pm 0.025$	4.5%
$I_3$ [kCnts]	355	$\pm 25$	6.8%
Bkgr <sub>Dec</sub> [kCnts]	0.0738	$\pm 0.0005$	0.6%
Bkgr <sub>IRF</sub> [Cnts/Chnl]	-5.20	$\pm 0.25$	4.7%
Shift <sub>IRF</sub> [ps]	- 336	$\pm 33$	9.7%
$T_{AvInt}$ [ns]	23.15	$\pm 0.61$	2.6%
$T_{AvAmp}$ [ns]	1.355	$\pm 0.078$	5.7%

Relative Intensities



Relative Amplitudes



# EasyTau Report

6/13/2022 1:59:33 PM



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## Container Curves

## Container Properties

Measurement Context: Decay

Summary:

Sample: 2022-05-31-UCNP@AUDSTX  
Solvent: Acetonitrile  
Excitation: V pol 376±1nm with LDH-P-C-375  
Detection: U pol 600±14nm 100000 peak counts  
grating 1200/500+  
detector UV-red [PMT]

## Comment

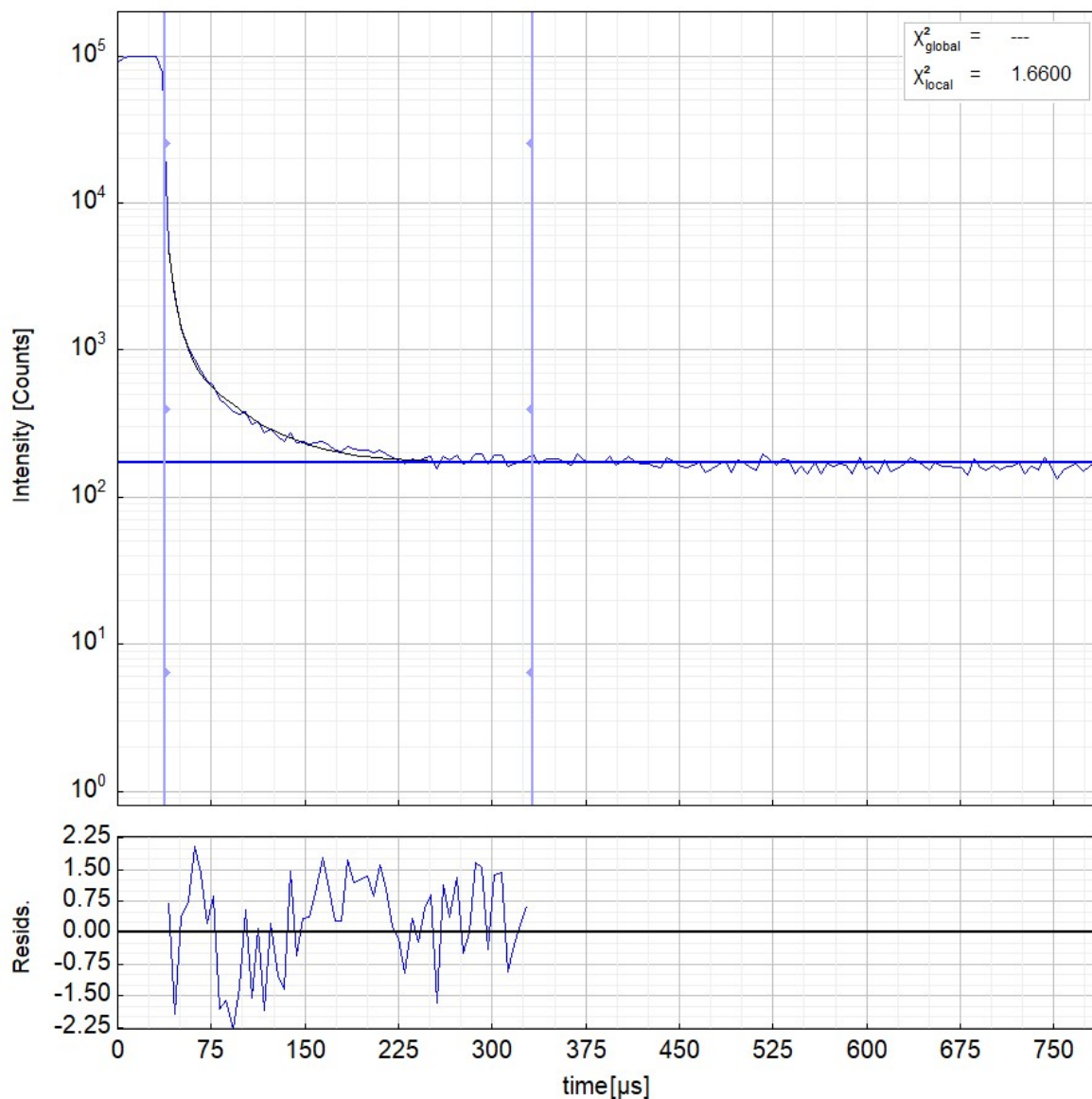
[\[Edit Comment\]](#)

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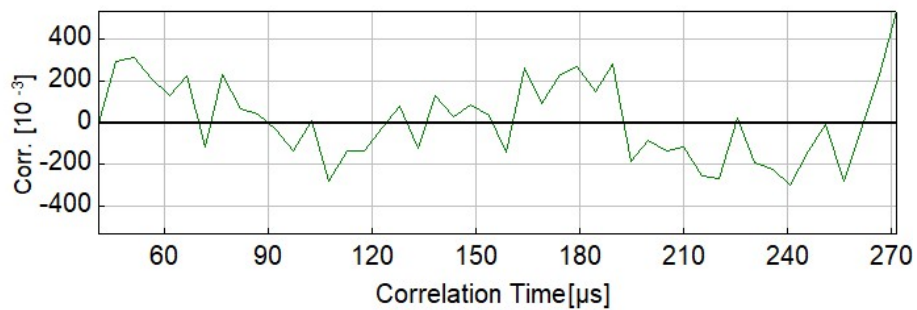
# Data Set: 1 / 1

Decay: crv[0]; IRF: ---

Fit



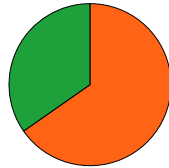
Autocorrelation (Residuals)



Fitted Parameters

Parameter	Value	$\Delta$	$\delta$
$A_1$ [kCnts/Chnl]	0.93	$\pm 0.17$	18%
$\tau_1$ [ns]	39 600	$\pm 4\ 100$	10%
$I_1$ [kCnts]	7.16	$\pm 0.71$	9.9%
$A_2$ [kCnts/Chnl]	3.72	$\pm 0.20$	5.3%
$\tau_2$ [ns]	5 240	$\pm 370$	6.9%
$I_2$ [kCnts]	3.81	$\pm 0.30$	7.6%
Bkg <sub>rDec</sub> [kCnts]	0.1719	---	---
$\tau_{AvInt}$ [ns]	27 700	$\pm 1\ 300$	4.6%
$\tau_{AvAmp}$ [ns]	12 090	$\pm 520$	4.3%

Relative Intensities



Relative Amplitudes

