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Dynamics of fluorescence depolarization in star-shaped oligofluorene-truxene molecules

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Supplementary Information

Fitting of the anisotropy kinetics was performed with the sum-difference method, as described in the manuscript. Specifically, with the anisotropy defined as:

$$r = \frac{I_{\parallel} - I_{\perp}}{I_{\parallel} + 2I_{\perp}},$$

the magic-angle data, denoted as the "sum" ($I_{\parallel} + 2I_{\perp}$), was fitted with a series of exponential functions, *S(t)*, convolved with the instrument response function (IRF):

$$S(t) = \sum_n A_n e^{\frac{-t}{\tau_n}}$$

To fit the anisotropy, the sum best fit, S(t), was multiplied by a trial function A(t):

$$A(t) = r_1 e^{\frac{-t}{\tau_1}} + r_2 e^{\frac{-t}{\tau_2}} + r_{\inf}$$

and the resultant function, *D(t),* is compared against the difference ($I_{\parallel} - I_{\perp}$) data when convolved with the IRF:

$$D(t) = [S(t) * A(t)] \otimes IRF$$

Consequently the components of the decay of the anisotropy are the parameters from *A(t)*, i.e. amplitudes of $r_{1,2}$ and time constants of $\tau_{1,2}$, with r_{inf} representing the final value of anisotropy. The initial value of the anisotropy, r_0, is the sum of the pre-exponential factors, i.e $r_1 + r_2$.

Fitted data for each of the sum and difference datasets are shown below, with the sum data in the top and difference data in the bottom panel in each plot.

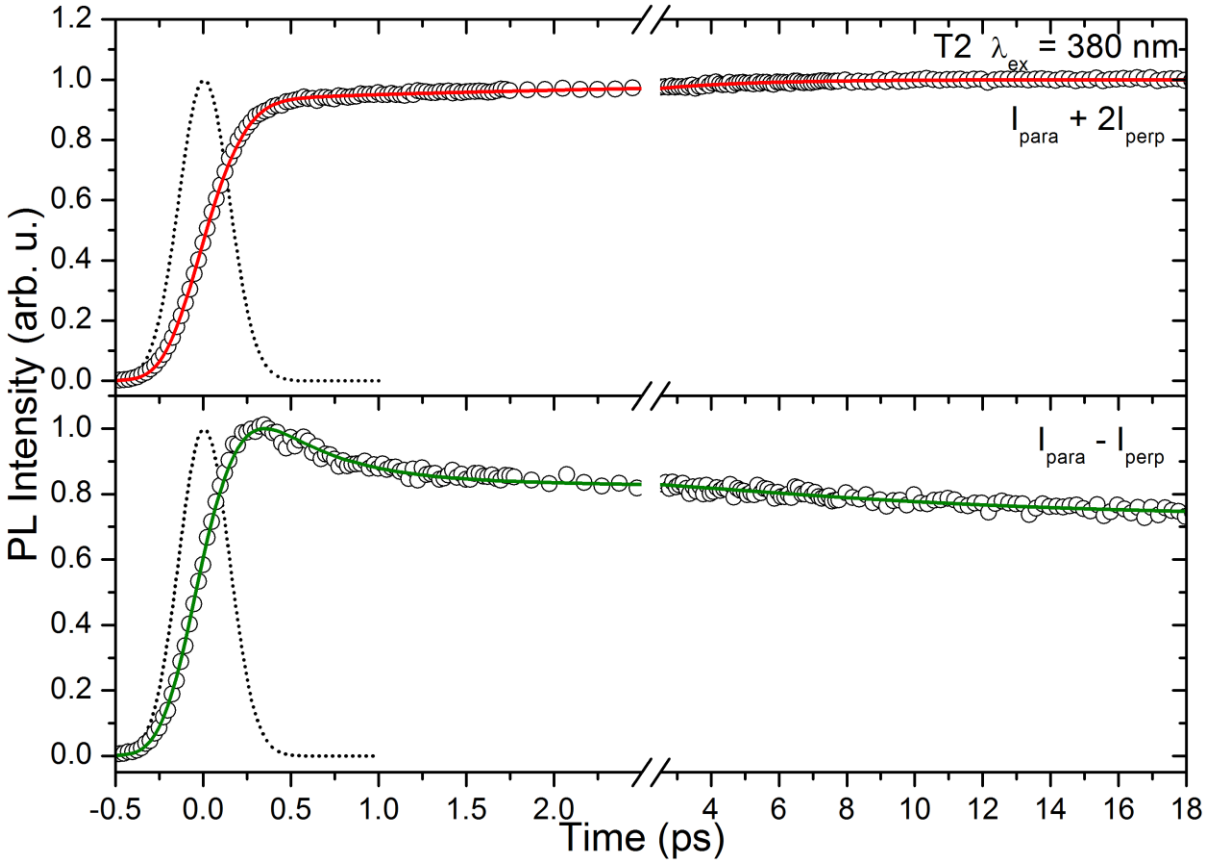

Figure S1: Sum (top panel) and difference (bottom panel) data with fits for T2. The instrument response function is shown as a dotted line (310 fs FWHM).

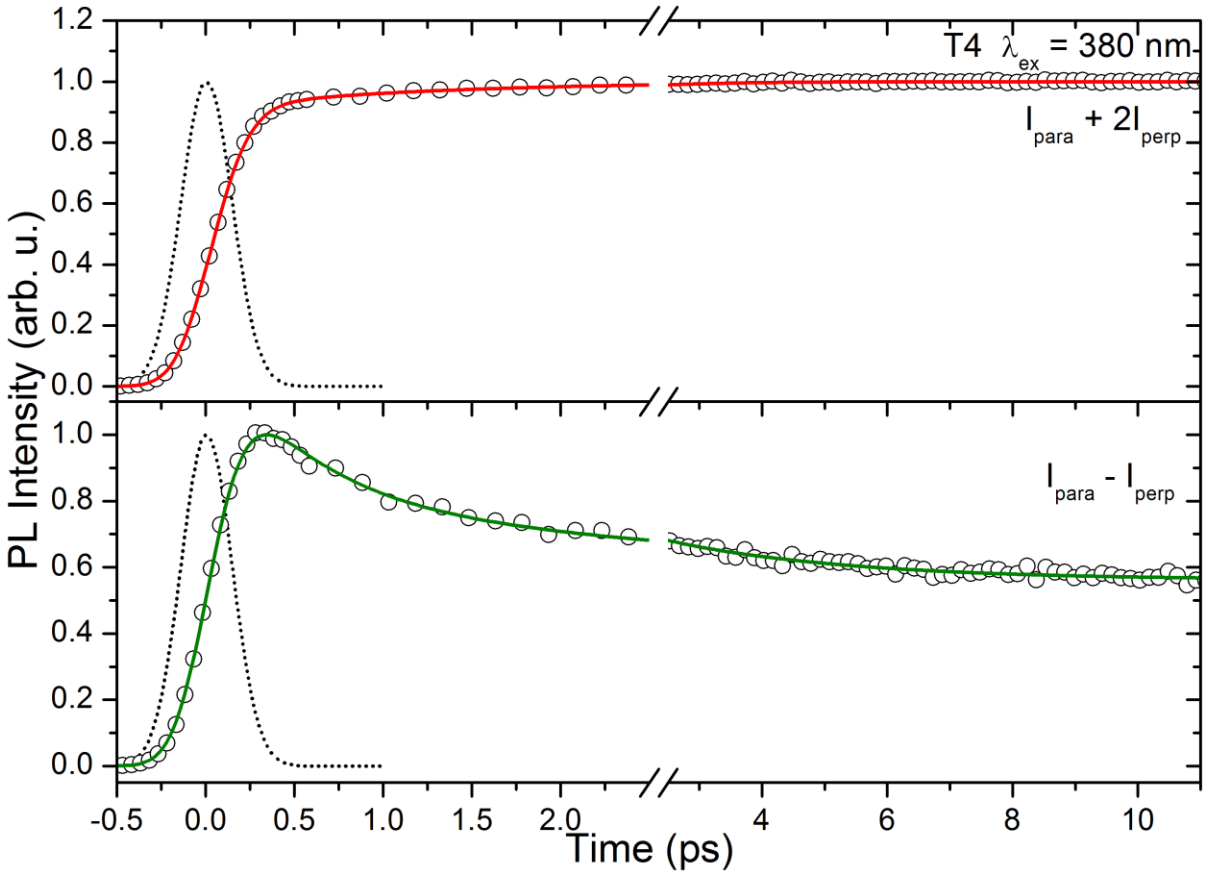

Figure S2: Sum (top panel) and difference (bottom panel) data with fits for T4 with 380 nm excitation. The instrument response function is shown as a dotted line (310 fs FWHM).

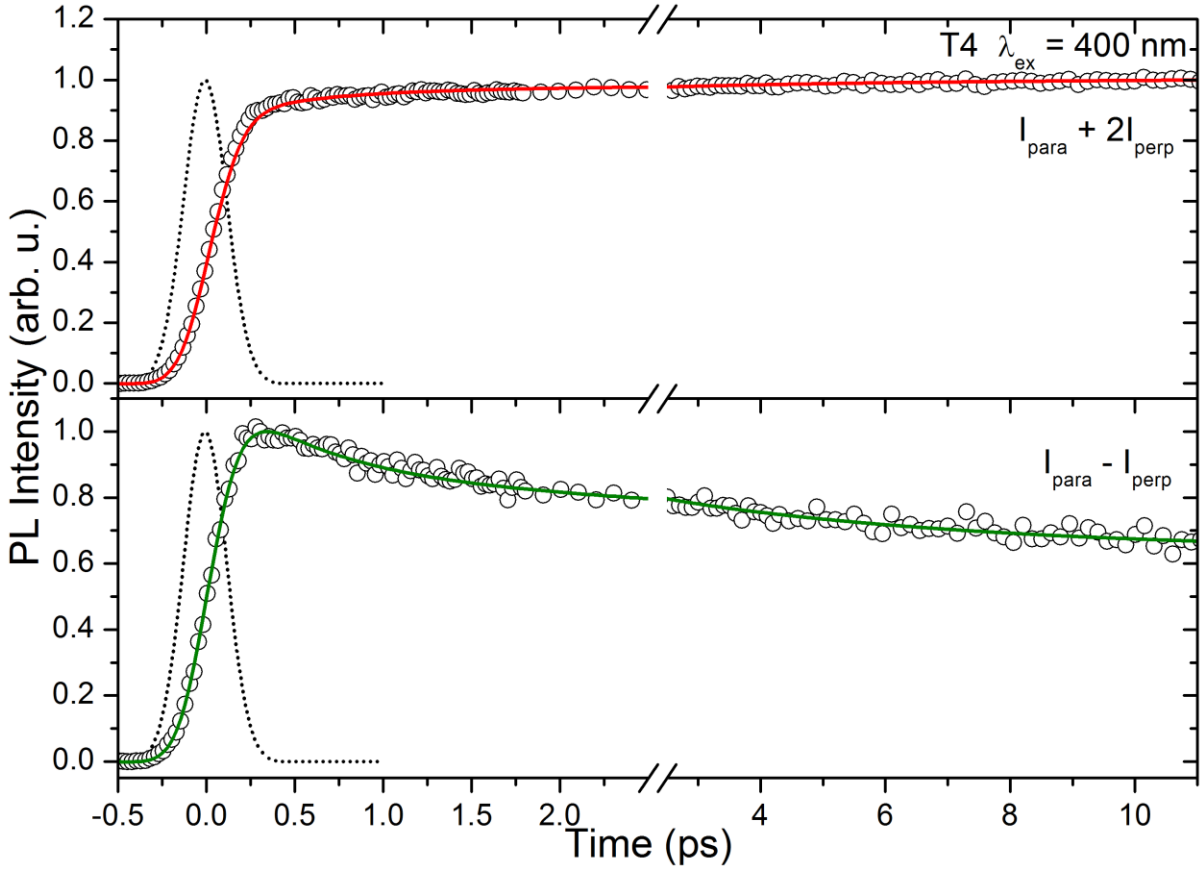

Figure S3: Sum (top panel) and difference (bottom panel) data with fits for T4 with 400 nm excitation. The instrument response function is shown as a dotted line (280 fs FWHM).

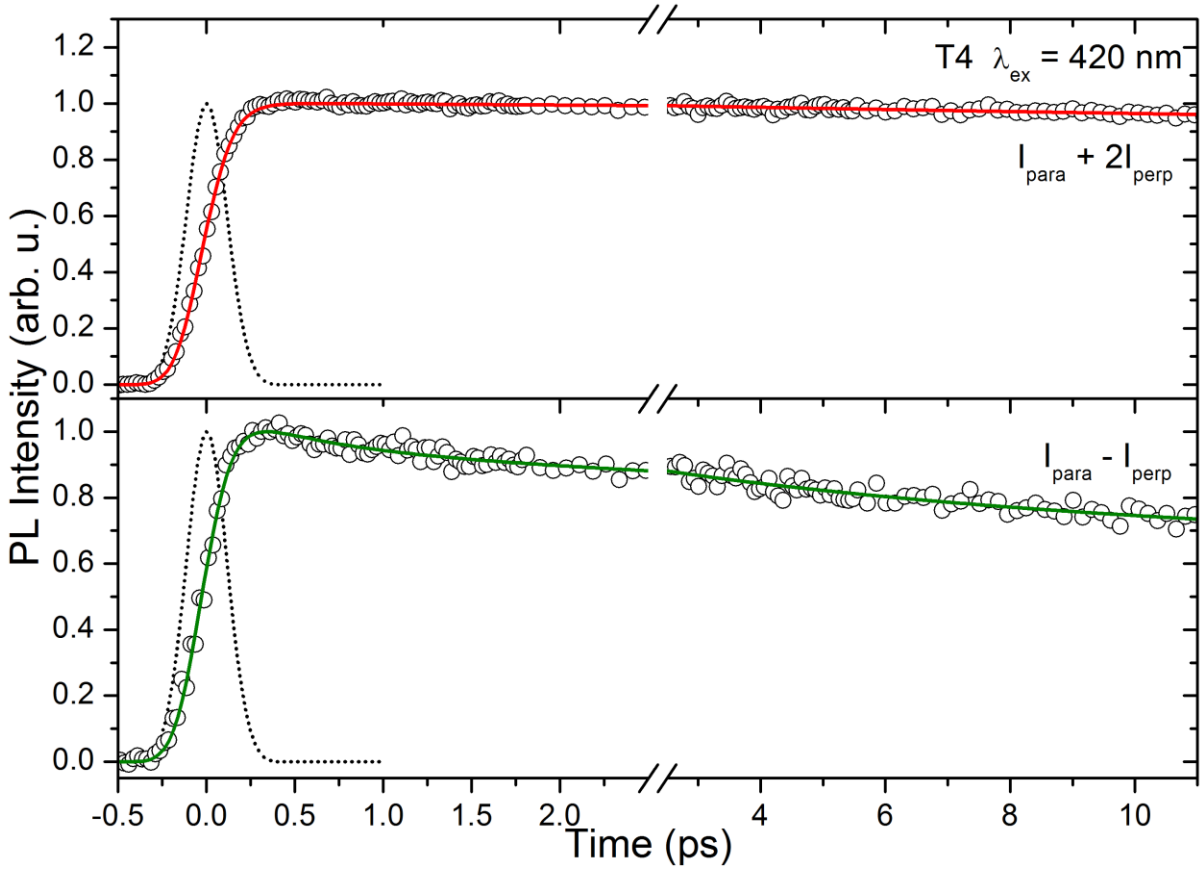

Figure S4: Sum (top panel) and difference (bottom panel) data with fits for T4 with 420 nm excitation. The instrument response function is shown as a dotted line (270 fs FWHM).

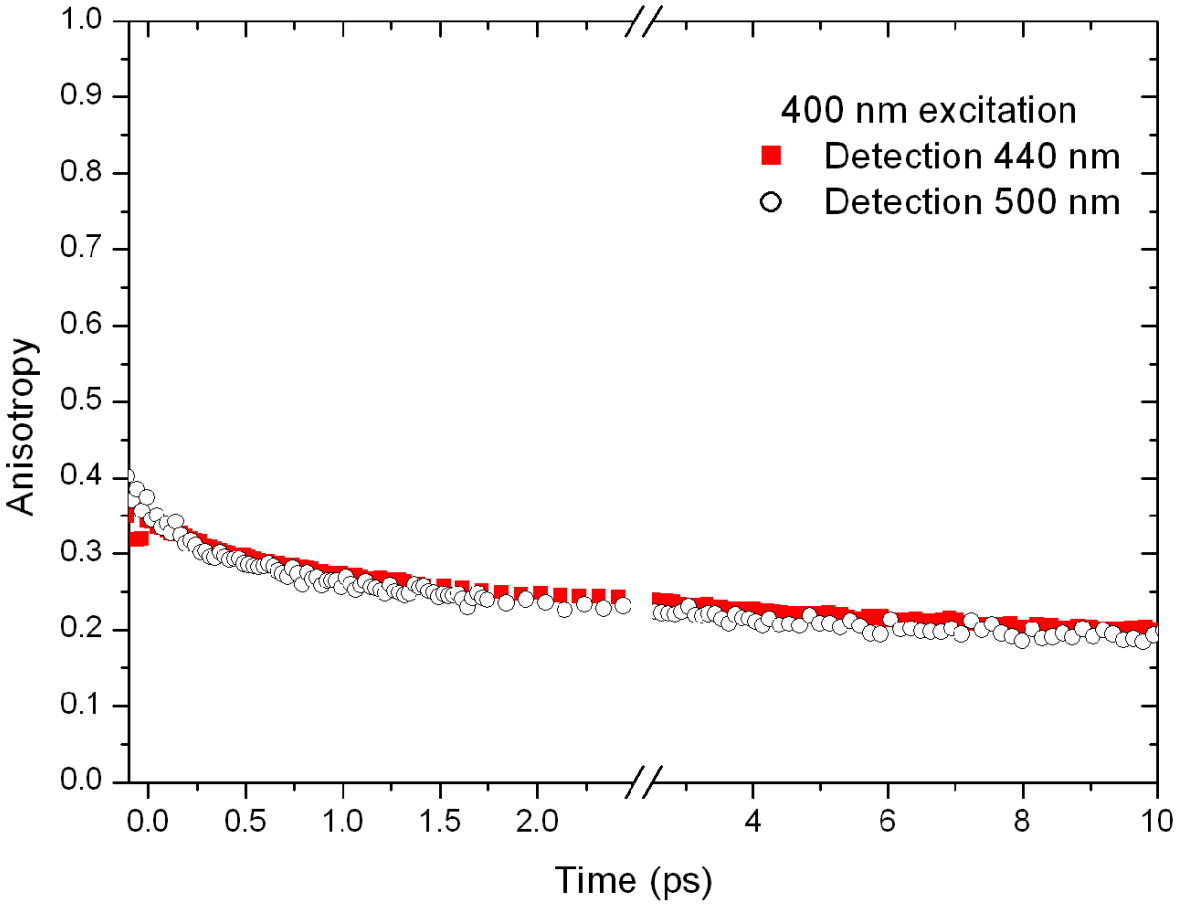

Figure S5: Detection wavelength comparison for the T4 molecule excited at 400 nm. The red squares show the anisotropy detected at 440 nm whilst the hollow round circles show the anisotropy detected at 500 nm.