

Electronic supplementary Information

A search for radical intermediates in the photocycle of LOV domains

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The file contains – for each of the 5 LOV domains studied (LOV1-wt, LOV2-wt, LOV1-C57S, LOV1-C57G, LOV2-C250S) the following supplementary information:

- a) Every data matrix **A** was analyzed by singular value decomposition (SVD). This yields a new representation of the form

$$A = \sum_{j=1}^N u_j s_j v_j$$

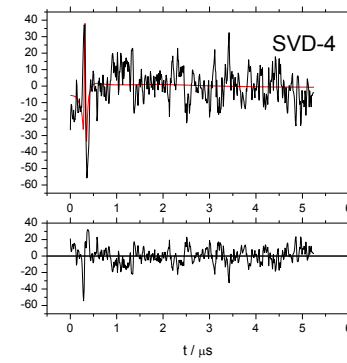
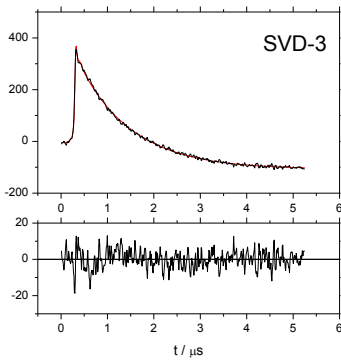
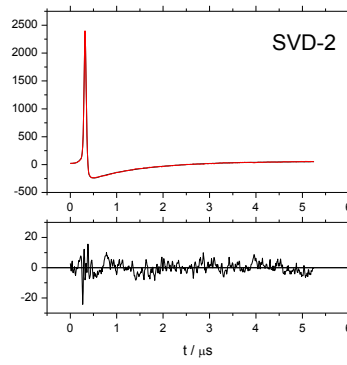
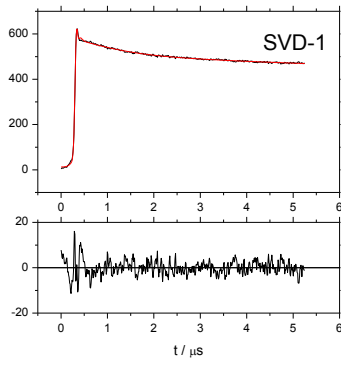
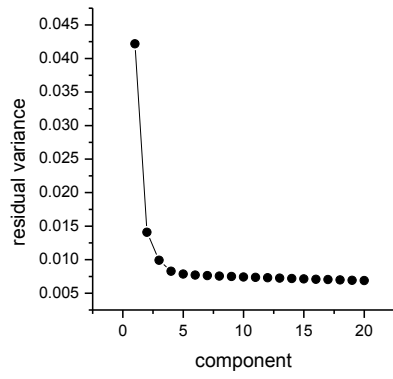
where the u_j are column vectors, the v_j are row vectors, N is the rank of the matrix, and the s_j are positive numbers in decreasing order. The approximations of the matrix are calculated with $K = 1, 2, \dots$ according to

$$A^{(K)} = \sum_{j=1}^K u_j s_j v_j$$

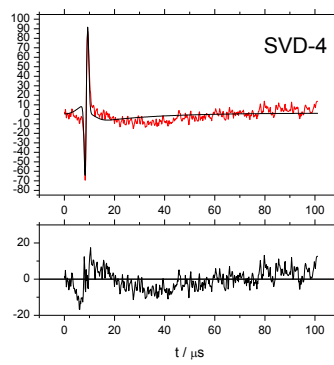
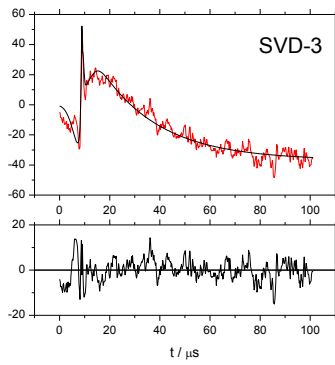
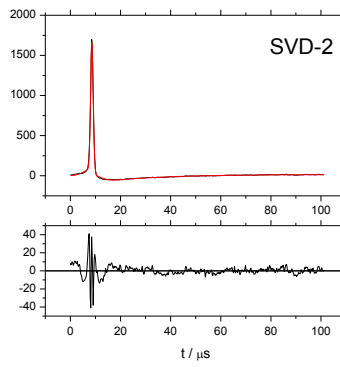
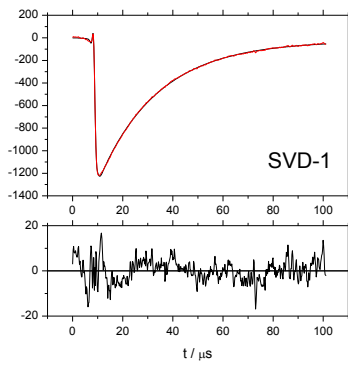
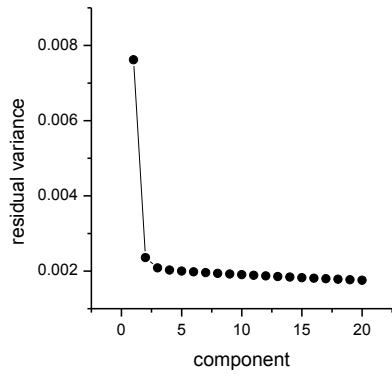
For each approximation a standard deviation $\sigma(K)$ is calculated as the root mean square deviation between $A^{(K)}$ and the original matrix. The plot of $\sigma(K)$ vs. K decreases and will reach zero at $K=N$. Inspection of this “residual variance”-plot shows, how many components K are needed to represent the significant part of the data, i.e., the first value of K that does not yield a substantial improvement of the standard deviation, and all following components, only contribute to the noise. The fit of the time functions is then made to those K vectors u_j .

- b) For each of the vectors u_j ($j=1..K$) considered in the fit, we show this vector, the fit, and the difference of both. The x-axis has 512 steps and corresponds to the time axis of the experiment. This allows a good visual inspection of the quality of the fit, much better than showing the difference of the two matrices (data minus fit) as a false color representation.

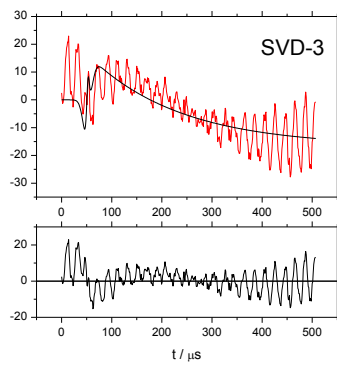
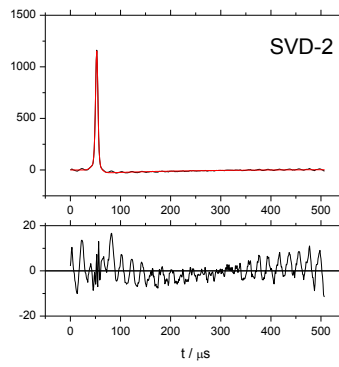
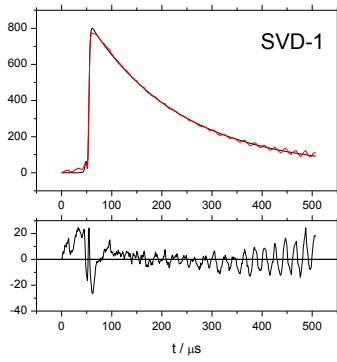
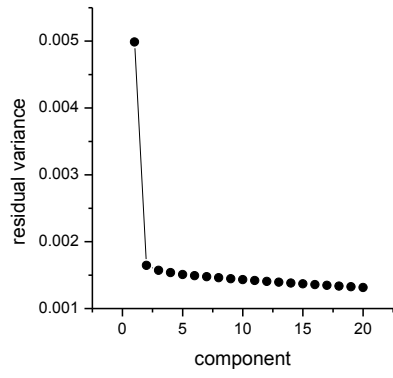
Fit to LOV1-wt (5 μ s)



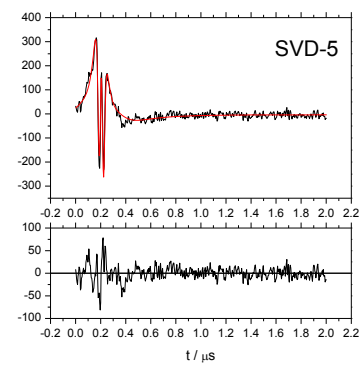
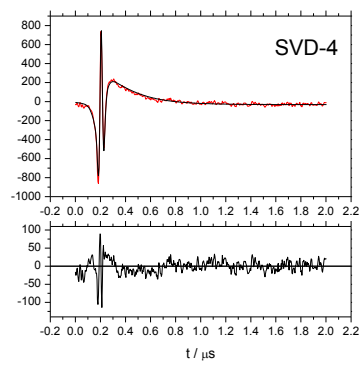
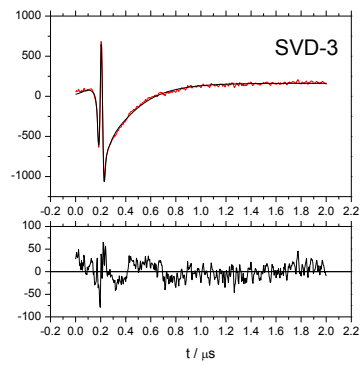
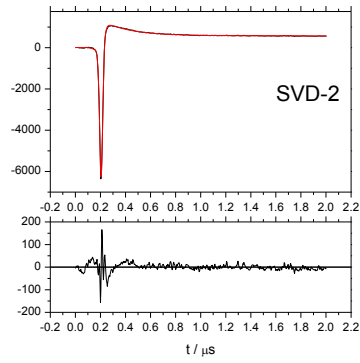
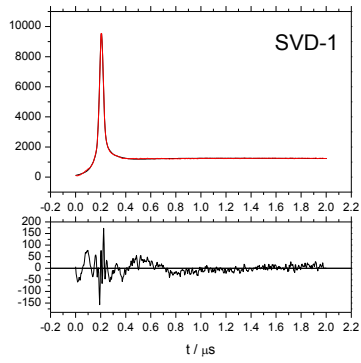
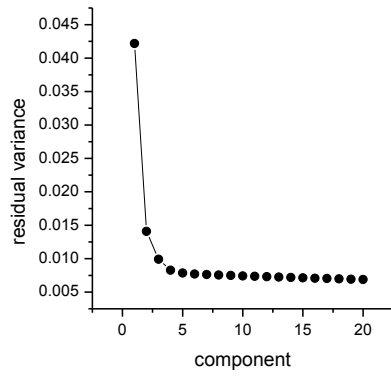
LOV1-C57S mutant (100 μ s)



LOV2-C250S mutant (500 μ s)



LOV2 wt (2 μ s)



LOV1 C57G 100 μs

