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# Coordination of the Biliverdin D-ring in Bacteriophytochromes

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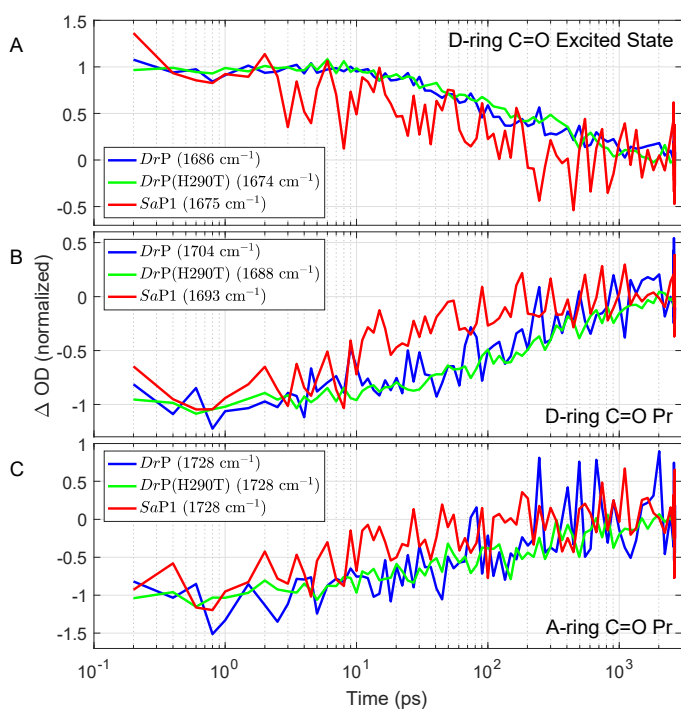
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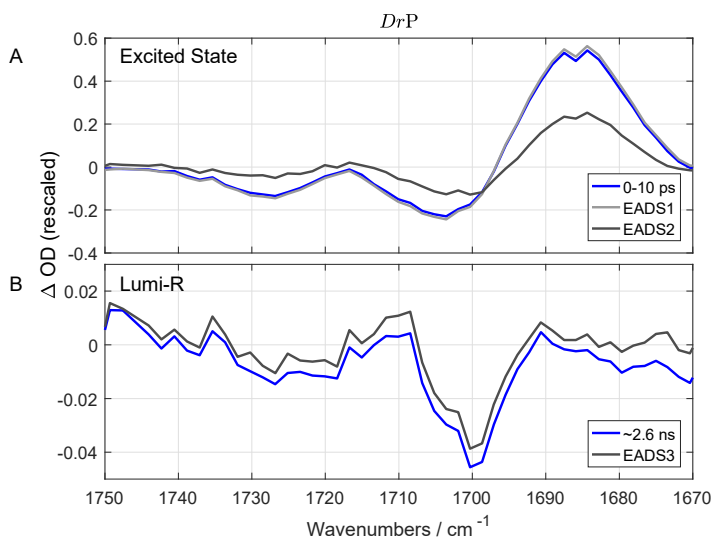
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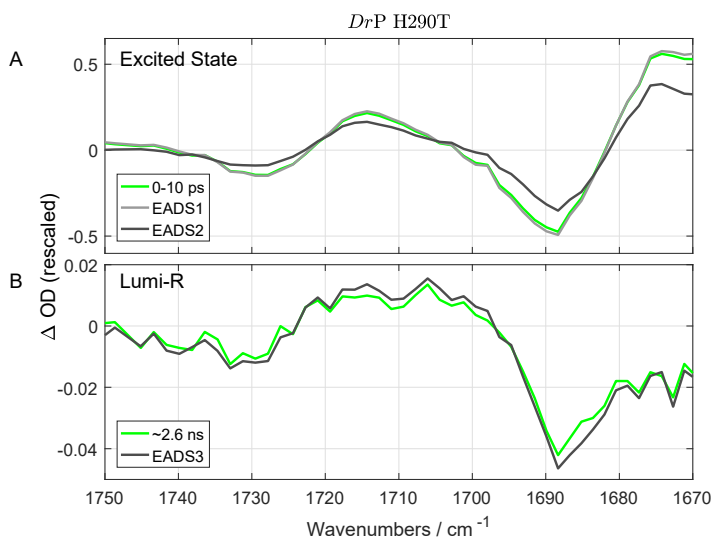
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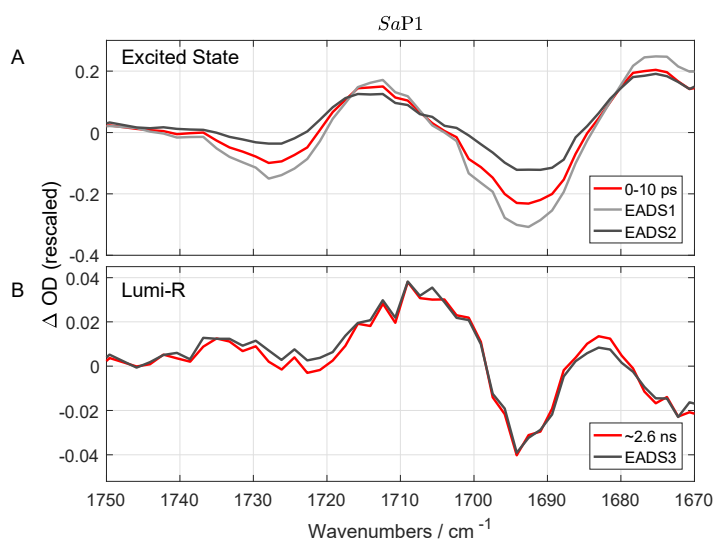
**Figure SI 1**, Normalized time traces of the IR signals of the carbonyl groups of the biliverdin at the excited state absorption (A), at the bleach of the D-ring (B), and at the bleach of the A-ring (C), of the *DrP*<sub>PSM</sub> (blue), *DrP*(H290T)<sub>PSM</sub> (green), and *SaP1*<sub>PSM</sub> (red) samples. The data shows that the excited state decay is faster in the case of *SaP1*<sub>PSM</sub> than the samples from *DrP*<sub>PSM</sub>, which show very similar decay profile irrespective to the H290T mutation.



**Figure SI 2**, Comparison of the Evolution associated difference spectra and the raw spectral data at the early time points (A) and at the late time-points (B) of *DrP*<sub>PSM</sub>. The 2.6 ns spectral information is obtained by integrating signals from 30 different time-points within a distribution of 5 ps around the 2.6 ns. The detected spectrum at 1-10 ps overlays very well with the EADS and the spectral difference between EADS1 and EADS2 pinpoints the need of introduction of a second time-component to the analysis.



**Figure SI 3**, Comparison of the Evolution associated difference spectra and the raw spectral data at the early time points (A) and at the late time-points (B) of *DrP*(H290T)<sub>PSM</sub>. The 2.6 ns spectral information is obtained by integrating signals from 30 different time-points within a distribution of 5 ps around the 2.6 ns. The detected spectrum at 1-10 ps overlays very well with the EADS and the spectral difference between EADS1 and EADS2 pinpoints the need of introduction of a second time-component to the analysis.



**Figure SI 4,** Comparison of the Evolution associated difference spectra (EADS) and the raw spectral data at the early time points (A) and at the late time-points (B) of *SaP1*<sub>PSM</sub>. The 2.6 ns spectral information is obtained by integrating signals from 30 different time-points within a distribution of 5 ps around the 2.6 ns. The spectral shape, detected at 1-10 ps , follows the spectral features of the EADS1. However, as the lifetime of the EADS1 is clearly shorter, the amplitude of the EADS1 is larger.