## Abstract Submitted for the MAR08 Meeting of The American Physical Society

dephasing processes Ultrafast in $\beta$ -carotene homologues MASAZUMI FUJIWARA, KENSEI YAMAUCHI, MITSURU SUGISAKI, HIDEKI HASHIMOTO, CREST-JST and Department of Physics, Graduate School of Science, Osaka City University, RICHARD COGDELL, Institute of Biomedical & Life Sciences, Glasgow Biomedical Research Centre, University of Glasgow — Carotenoid is an important pigment in a bacterial light-harvesting system together with bacteriochlorophyll (BChl). In the photosynthetic system, these two kinds of pigments cooperate to efficiently capture the solar energy and to transfer that energy to the reaction center within a few picoseconds. In this study, transient grating signals in  $\beta$ -carotene homologues using sub-20 fs excitation pulses were measured in order to investigate the dependence of the coherence dynamics on the  $\pi$ -conjugation length of these carotenoids. The  $\pi$ -conjugation length is a decisive factor in determining the efficiency of energy transfer to BChls. Therefore, it is important to study how the conjugation length affects the coherence dynamics. The results show that the population-induced dephasing is a major factor in the total dephasing process in the longer-chain carotenoids. On the other hand, pure dephasing time, which indicates the strength of the system-bath interactions, does not depend on the conjugation length. It is also concluded that the central C=C stretching mode is the major channel for energy dissipation to the environment regardless of the conjugation length.

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