Quantifying triplet excited states in dissolved organic matter photochemistry

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Triplet excited states of dissolved organic matter are important intermediates in the photochemistry of natural waters. They are strong oxidants that are central to many transformation reactions involved in the cycling of natural and anthropogenic organic compounds. Additionally, these triplet states are the precursors for many other reactive species, including singlet oxygen, superoxide, hydrogen peroxide and hydroxyl radical. The study of these triplet states is made difficult by the fact that the they are not a single species, but a complex mixture of many chemical species. Recent work in our laboratory has focused on laser spectrscopy-based strategies that simplify the complex signal mixture arising from triplet states to yield information their kinetics, oxidation potentials and triplet energies. This presentation will summarize recent progress in these efforts.