

Abstract Submitted
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Measuring solvation dynamics using sum-frequency cross-correlation frequency resolved optical gating (SF XFROG)¹ NANCY LEVINGER, Colorado State University, BENJAMIN LANGDON, Colorado State University — Solvation dynamics has been used to measure the dynamical response of a solvent to an electronic perturbation. The response is typically followed through sum-frequency conversion of sample emission with short light pulses to time-resolve spectral shifting of a fluorescent probe molecule. In contrast to traditional fluorescence upconversion techniques where the time resolved fluorescence signal is approximated from 10-15 different sum-frequency gated decays distributed across the fluorescence spectrum, sum-frequency cross-correlation frequency resolved optical gating offers the opportunity to determine the electric field of the sample fluorescence as a function of time. Dynamic quantities associated with changes in the sample emission, such as solvent relaxation, can then be obtained directly from the electric field without assumption of a particular spectral lineshape. We show that the time evolving phase of the SF XFROG signal corresponds to the solvent response function, $C(t)$, and that the technique also reveals details about vibrational modes associated with the relaxation.

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