Fluorescence Detection and Lifetime Imaging through Stimulated Emission

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Stimulated emission provides unique opportunities in fluorescence detection and the corresponding lifetime imaging. The coherence as a result of stimulated emission can be utilized for long working distance fluorescence detection and implement of interferometric techniques.

In contrast with spontaneous emission, high numerical aperture optics is not required to collect the stimulated emission signal efficiently. We used the pump-probe setup in combination with various pulsed laser pairs to realize long distance fluorescence lifetime imaging. Both the optical and electronic delays are used to address short and long lifetimes, respectively. Additionally, time-resolved anisotropy measurement has also been demonstrated by changing the polarization state of SE beam relative to the excitation beam.