single-photon timing

Technique that permits recovery of the parameters characterizing a fluorescence decay after pulse excitation (in particular excited-states lifetimes). It is based on the creation of a time histogram of many stochastic events involving the time delay between the electronic excitation of a molecule or material and its emission of a photon from an excited state. A key to the technique is that no more than one photon strike the detector per pulsed excitation. Excitation is commonly achieved with a flash from a repetitive nanosecond lamp or diode laser or a CW operated laser (mode-locked laser). The essential components of the hardware are a device to measure the excitation-emission delay time and another to determine the relative frequency of photons reaching the detector at each delay time. Delay times are usually measured with a time-to-amplitude-converter (TAC), using voltage to measure the delay between a start and a stop signal. The frequency of events with each delay is stored in a multi-channel analyser. This term is preferred to time-correlated single-photon counting.

Source:
PAC, 2007, *79*, 293 *(Glossary of terms used in photochemistry, 3rd edition (IUPAC Recommendations 2006))* on page 420