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photon echo

Time-resolved optical spectroscopy in which the inhomogeneous broadening of absorbers is eliminated by the proper choice of geometry in a four-wave mixing experiment.

Notes:

1. Term applied to a group of non-linear optical techniques such as integrated echo, time-gated echo, three-pulse echo peak shift, heterodyne-detected echo and 2D-echo.
2. Photon echo techniques make use of the third-order optical polarization and 'hyper-susceptibility'. The main distinguishing feature of photon echo methods from all other third-order processes is the time ordering of the field interactions that leads to a rephasing process in the induced polarization to remove inhomogeneous contributions to the absorption linewidth.
3. In terms of mathematical description, the photon echo is equal to the spin echo (solid-state physics) from which a term 'echo' was borrowed.
4. Technique used, e.g., to probe solvation dynamics upon (ultra-short) pulse excitation of a chromophore.

Source:

PAC, 2007, *79*, 293 *(Glossary of terms used in photochemistry, 3rd edition (IUPAC Recommendations 2006))* on page 394

