Non-perturbative approach to three-pulse photon echo HUI
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Texas AM University — We rewrite the nonlinear spectroscopy response with the
formalism developed in quantum optics. Instead of commonly used perturbation ap-
proach, we adapt a quantum dynamical evolution into the calculation of signal. In
this new approach, we show that high-order terms has essential contribution to the
nonlinear signal of the three-pulse photon echo. A detailed study of the two-pulse
and three-pulse echo is performed to show the advantage of using three pulses in the
experiments to direct probe the coherence between two excited states. We demon-
strate the principal with a three-level V-type system. And we show the correlation
between the bath modes of the two excited states may induce a longer decoherence
time than that with only independent baths.

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