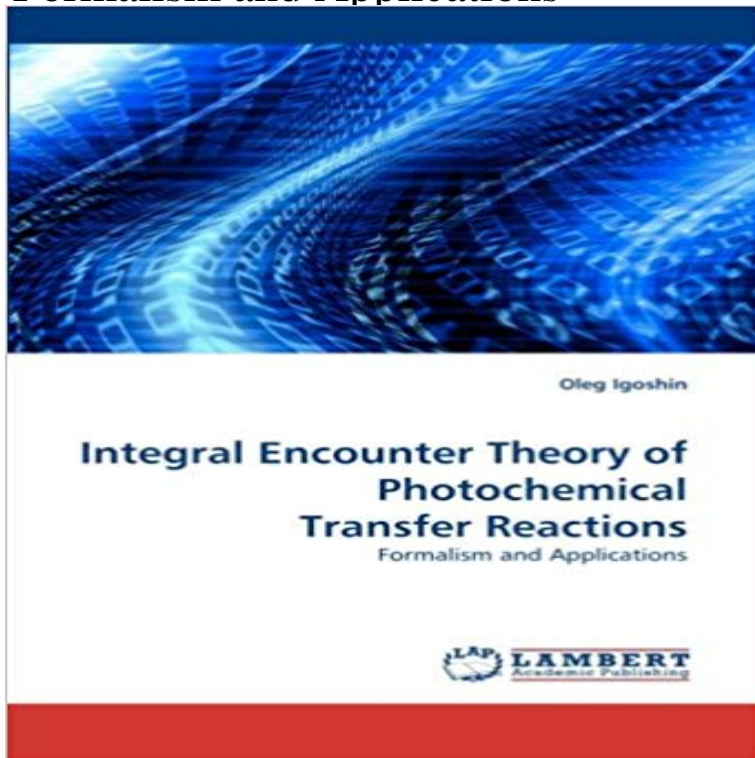


# Integral Encounter Theory of Photochemical Transfer Reactions: Formalism and Applications



Non-Markovian (memory function) chemical kinetics formalism -Integral Encounter Theory (IET) is a common approach to study the kinetics of chemical reaction beyond conventional mass-action formalism. This work summarizes a general formalism of IET and its application to study two types of photochemical reaction systems. For the first application, the biexcitonic photoionization with short lived (singlet) excitations, the non-Markovian kinetics derived from IET was shown to be more accurate and detailed than its oversimplified Markovian analog. Only for long lived (triplet) excitations the non-Markovian and Markovian results are similar, provided that the rate constants are properly defined. For the second application, photooxidation competing with energy quenching was studied. We obtained the stationary concentration of the free carriers, with account of their geminate recombination before separation, as well as the stationary rate of singlet oxygen generation, affected by preliminary quenching of nearest excitations in the course of ionization.

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Integral encounter theories of multistage reactions. II. reversible inter-molecular energy transfer in liquid solutions. photochemical kinetics, being unavailable for most conven- very first application of matrix-form IET to reversible reac- the integral formalism using memory functions obtained in. **Integral Encounter Theory of Photochemical Transfer Reactions, 978** The integral encounter theory (IET) has been extended to the reactions limited by diffusion . A nonadiabatic theory for electron transfer and application to ultrafast catalytic reactions .. To demonstrate the formalism, the time-dependent ETreaction cesses in dye-sensitized solar cells and other photochemical systems. **Search results for**

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Non-Markovian Theories of Transfer Reactions in Luminescence and Chemiluminescence and Photo- and Electrochemistry **The integral encounter theory of multistage reactions containing** Electron transfer is a fundamental process in biology and chemistry.(1-16) Therefore, a complete fitting function of a bimolecular ET reaction should (6) The numerical solution of the encounter theory using a set of an appropriate . A time integration of eq 1 using the CollinsKimball sink term [from eq 3] **Search results for Formalization - MoreBooks!** Abstract This chapter introduces the supramolecular photochemistry, i.e. electron transfer processes, Marcus theory is presented as well as quantum . and the free energy changes of energy and electron transfer reactions can readily solution, can encounter a quencher B. The excited state lifetimes in the absence. **Research Interests: Positions: Education: Honors and - Oleg Igoshin** integral encounter theory (IET) which uses integral terms instead of reaction rates and memory functions as their The reversible inter-molecular energy transfer and quenching by Keywords: Photochemistry Reaction mechanisms Kinetics Electron and energy transfer. 1. matrix and Hamiltonian formalism and named.