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Effects of multi-photon interferences from internally generated fields in strongly resonant systems

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1. Introduction: Historical development and rationale for this review

... Thus, to establish a reasonable perspective on the subjects of this review, an approximate chronological trace of the developments is presented and a rationale for a systematic review of the field is offered.

Historically, mid-1970s to the mid-1980s represents a milestone period in the field of spectroscopy when relatively

high powered tunable pulsed dye lasers become widely available. The rapid development of this laser technology led

to an intense interest in studies of various nonlinear optical processes involving multi-photon-resonant atomic and

molecular transitions in strongly resonant (gaseous phase) media. Resonantly enhanced multi-photon ionization (MPI) of atomic and molecular gases and vapors were popular subjects for a variety of novel spectroscopic studies [1-5].

MPI spectroscopic methodologies offered obvious extensions beyond classic absorption/emission methods. States of

relatively high energy could be reached with absorption of two or more visible photons and transitions normally forbidden under parity or angular momentum selection rules could often be accessed through multi-photon schemes.

With the large resonant enhancements realizable in gases and vapors, early tunable pulsed dye lasers were quite capable of driving observable multi-photon-resonant transitions through second, third and fourth order, even in a molecular beam experiment [1-6]. ...

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