

Influences of Size and Relaxation Time on Optical Free Induction Decay in a Small Spherical CdSe/ZnS Quantum Dot Quantum Well

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The optical free induction decay (OFID) induced by the transition between 1s and 1p state in a small isolated spherical CdSe/ZnS quantum dot quantum well (QDQW) has been studied numerically under the framework of effective-mass approximation. The size and relaxation time-dependent properties of the OFID have been obtained and analyzed. It shows that the OFID-change mechanisms dependent on shell thickness and core size are different. Moreover, the OFID signal decays sharply in amplitude and life as the transverse relaxation time being reduced while the change is slight to the longitudinal relaxation time. By comparing these two factors, we infer that the size mainly influences the amplitude of the decay signal and the delay time is basically determined by the relaxation time.

Key words: Optical Free Induction Decay; Quantum Dot Quantum Well; Quantum Size; Relaxation Time.

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