Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Bichromatic Resonant Light-Scattering From a Quantum Dot[1]
MANOJ PEIRIS, KUMARASIRI KONTHASINGHE, University of South Florida, YING YU, ZHICHUAN NIU, Chinese Academy of Sciences, ANDREAS MULLER, University of South Florida — The near-resonant response of a two-state quantum system to a near-resonant driving field constitutes a central problem of quantum optics. Best known is the case of monochromatic laser excitation for which the scattered light distinctively exhibits oscillations at the Rabi frequency. In contrast, non-monochromatic driving fields, although inherent to all pump-probe experiments, have been applied little under resonant detection, despite obvious relevance for advanced coherent manipulation. For example resonant light scattering under bichromatic laser excitation has been theoretically studied spectrally, and measured using atomic beams. We report on the spectral and temporal properties of the light scattered near-resonantly by a single quantum dot under bichromatic laser excitation. The dynamics of the observables are characterized by Rabi oscillations but also oscillations at half the difference of the lasers' frequencies and harmonics thereof, persisting beyond the natural lifetime. Such "dressing" of the optically "dressed" states is a significant step towards complete quantum control of a quantum bit.

[1]NSF grant No. 1254324

B. Manoj Peiris
University of South Florida

Date submitted: 02 Jan 2014 Electronic form version 1.4