

# Study of Electric Field Induced Second Harmonic (EFISH) Generation from Au and Ag implanted LiNbO<sub>3</sub> nano Composites

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## Abstract

Second Harmonic generation (SHG) using laser requires a non centro-symmetric materials or materials that lack inversion symmetry. However, symmetry breaking interface between metal –semiconductor can also permit third order process also known as EFISH .The paper reports the comparative study of EFISH generated from Au and Ag nano particles implanted on LiNbO<sub>3</sub> substrates using ion beam implantation technique . We have employed  $\lambda= 782$  nm of Ti: Sapphire laser having repetition rate of 80 MHz pulse width of  $85\pm 5$  femto seconds with maximum pulse energy of the order of 10.5 nJ. The generated second harmonic signal is separated out from the fundamental using UV filter and detected with the help of PMT coupled with Lock-in amplifier . We have also tested the polarization effect and observed the presence of dipole mode in case of Au implanted nano composites and quarderpole mode in Ag implanted nano composites.

**Keywords.** SHG, Au and Ag nanoparticles, Lock-in-amplifier, plasmon

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