INDIAN ASSOCIATION FOR THE CULTIVATION OF SCIENCE
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Seminar Notice

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Theoretical Physics Department

Title:	**Nonlinear optical conductivity and photoconductivity of two-band systems beyond the linear response regime**
Speaker:	**Amit Agarwal, I.I.T., Kanpur**
Date:	**December 19,2016 (Monday)**
Time:	**04:00 p.m.**
Venue:	**Theoretical Physics Seminar Room (R/No.-C406), 3rd Floor, Centenary Building, IACS**
Abstract:	We present a general formulation/model to calculate the dynamic optical conductivity and photoconductivity beyond the linear response regime, of any electronic system whose quasiparticle dispersion can be effectively described by a two-band model. Our phenomenological formulation is based on the optical Bloch equations, and offers a unified way to study the dynamical conductivity, photoconductivity, and the differential transmission spectrum, across regimes of linear and non-linear behaviour, for optical frequencies, at finite temperatures and doping. We show that the non-linear optical behavior is intrinsically controlled by a dimensionless parameter which is proportional to the applied field strength, and inversely proportional to the optical frequency. In our formulation, the interband population inversion, and coherence decay rate rate play an important role, and we propose that these can be estimated by a photoconductivity experiment. We use our formalism to analytically calculate the nonlinear optical conductivity and photoconductivity of doped and gapped graphene, focussing on non-linear deviations from the known linear response results.

All are cordially invited to attend the seminar