物理学会北陸支部特別講演会

講演題目:

DYCE optical physics: A new research field combining quantum many-body physics and quantum nonlinear optics

講師: 小川哲生先生

大阪大学大学院理学研究科物理学専攻

日時: 11月20日(金) 16時50分より

場所: 富山大学・五福キャンパス・理学部多目的ホール

講演概要:

We are interested in solid states, which are composed of many microscopic components, e.g., atoms and molecules. Such materials exhibit dramatic and interesting phenomena, phase transitions and nonlinear responses, due to interactions among the constituents. Our group is trying to clarify these fancy phenomena with the use of analytical and computational techniques. Specifically, we study dynamical/nonlinear responses of condensed matters, in particular, cooperative phenomena related to optically-excited states of quantum many-body systems.

One of main subjects is "electron-hole (e-h) systems" in photoexcited semiconductors, where the dynamical Coulomb interaction is of importance to form various phases such as exciton gas, e-h plasma, e-h liquids, exciton Bose-Einstein condensation, and e-h BCS condensate. We perform systematic and quantitative surveys of such phases focusing on the following special topics: (i) Search for the phase diagram of e-h ensembles including the exciton's condensations and Mott transition. (ii) Evaluation of dynamical and coherence properties of light emitted from such e-h ensembles. (iii) Theoretical modeling of the dynamics of quantum phase transition of e-h ensembles. In this seminar, I will talk about the frontier of this DYCE (dynamically-correlated electron) optical physics.

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