NTML(BRL)-APCTP SEMINAR SERIES

Topological Matter Out of Equilibrium

Period April 2022 ~ June 2022

Venue Online (ZOOM)

Overview

Recently, a small but ambitious research group, funded by National Research Foundation (NRF) for three years, Nonlinear Topological Matter Laboratory (NTML) has been launched to investigate dynamical phase transitions in topological matter driven by electromagnetic fields including light. Our research group consists of three experimentalists (Prof. Heon-Jung Kim, Prof. Jong-Soo Rhyee, and Prof. Jungkil Kim) and one theorist (Prof. Ki-Seok Kim), which cover material preparation, electrical and thermal transport, light-matter interaction, device, and anomaly and transport theory. Additionally, the Junior Research Group "Non-equilibrium many-body physics" (Ryo Hanai) started in April 2021 with a broad interest in collective phenomena out of equilibrium. To promote this research direction in Korean Physical Society, we open NTML-APCTP seminar series on topological matter out of equilibrium, inviting several well-known experts in this direction mentioned above.

Invited Speakers (Tentative)

- Mark S. Rudner (University of Washington) 15th April
- Alexey Gorshkov (University of Maryland and NIST) 6th May
- Liang Wu (University of Pennsylvania) 20th May
- Takahiro Morimoto (University of Tokyo) 3rd June
- Hai-Zhou Lu
  (Southern University of Science and Technology) 24th June

Organizers

- Heonjung Kim (Daegu Univ.)
- Jongsoo Rhyee (Kyung Hee Univ.),
- Jungkil Kim (Jeju Nat. Univ.)
- Kiseok Kim (POSTECH)
- Ryo Hanai (APCTP)

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Photocurrent of Polariton Condensates

Prof. Takahiro Morimoto

University of Tokyo

June 3rd (Fri.) 10:00

Online via ZOOM

Shift current is a novel mechanism for a photovoltaic effect in noncentrosymmetric crystals and arises from shift of electron wavepacket upon photoexcitation, which has a close relationship to modern theory of electric polarization [1]. So far, shift current has been mostly investigated for electronic excitations in band insulators, for example in ferroelectric materials and topological semimetals. In contrast, shift current from other elementary excitations is less investigated so far. In this talk, I present such a mechanism for the photovoltaic effect, focusing on exciton polaritons that appear out of equilibrium [2]. We show that nonequilibrium steady states of polaritons exhibit photocurrent generation with breaking of inversion and time reversal symmetries. I will discuss possible experimental realization in transition metal dichalcogenides.

[1] T. Morimoto, and N. Nagaosa, Sci. Adv. 2, e1501524 (2016).
[2] T. Morimoto, N. Nagaosa, Phys. Rev. B 102, 235139 (2020).

■ **ZOOM Webinar**

1) Please register through this ZOOM link (password 0)
https://us06web.zoom.us/meeting/register/tZcoceuvpjgiHdTfgKd65mpFllDNta3r19hJ
2) Join the webinar with a link generated after the registration
3) Please rename your profile - E.g. **Full name (affiliation)**

■ **Contact information**

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