

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 (KyungHee Univ.),
- Jungkil Kim (Jeju Nat. Univ.)
- Kiseok Kim (POSTECH)
- Ryo Hanai (APCTP)

NTML(BRL)-APCTP SEMINAR SERIES

Nonlinear optical and terahertz spectroscopy on topological semimetals

Prof. Liang Wu

University of Pennsylvania

May 20th (Fri.) 10:00

Online via ZOOM

The second-order optical nonlinearity has been a focus of basic research and technological development for decades as it is both a probe of inversion symmetry breaking in media and the basis for generating coherent light from far-infrared to ultraviolet wavelengths. Here, we focus on the relation between band geometry and topology with nonlinear optics. In my first part of my talk, I will present the discovery of giant second harmonic generation in the polar Weyl semimetal TaAs[1,2]. In the second part, I will talk about nonlinear THz emission spectroscopy on chiral topological semimetals. A remarkable example occurs when chiral semimetals with topologically protected band degeneracies are illuminated with circularly polarized light. Under the right conditions, the part of the generated photocurrent that switches sign upon reversal of the light's polarization, known as the circular photogalvanic effect (CPGE), is predicted to depend only on fundamental constants. The conditions to observe quantization are non-universal, and depend on material parameters and the incident frequency. In my talk, I will discuss nonlinear terahertz emission spectroscopy with tunable photon energy from 0.2 eV - 1.1 eV in the chiral topological semimetals CoSi [3,4] and RhSi[5]. Particularly, we identify a large longitudinal photocurrent in CoSi, which is much larger than the photocurrent in any chiral crystal reported in the literature. I will discuss how quantized CPGE can be reached in these two compounds and the experimental status.

■ ZOOM Webinar

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- 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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