Center for Artificial Low D Electronic Systems

2024 IBS-CALDES Seminar

- ✓ **Date & Time:** 2:00PM, October 17 (Thu), 2024
- ✓ **Venue:** IBS POSTECH Campus Bldg. 105
- ✓ **Speaker & Title**

2:00PM~ Prof. Heejun YANG (KAIST)

Atomic-scale thermopower in 2D topological and correlated materials

**** Will given in Korean only.***

Organized by: Dr. Jhinhwan LEE (jhinhwan@ibs.re.kr, 054-260-9014)

- **2:00PM~**

(This talk will be given only in Korean)

Atomic-scale thermopower in 2D topological and correlated materials

Heejun YANG
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Thermoelectricity (i.e., thermopower generation) has been investigated mainly on the macroscopic scale despite its origin being linked to materials' local electronic band structure. Recently, the microscopic origins of thermopower have gained attention in the design of novel and efficient thermoelectric devices. In particular, distinct origins for thermopower have been expected with low-dimensional, strongly correlated, and topological materials. In this presentation, I will demonstrate our findings on thermoelectric puddles[1,2], phonon puddles[3], and thermal biasing effects to break the atomic lattice symmetry[4] in variously stacked graphene and 1T-TaS_2, using our Scanning ThermoElectric Microscopy (SThEM). Based on the sensitive probe of the local density of states' derivatives in SThEM, harnessing atomic-scale thermopower can be achieved above room temperature, distinguished from conventional low-temperature studies with scanning tunneling microscopy.

References

1. Nano Letters 19, 61 (2018), Coherent Thermoelectric Power from Graphene Quantum Dots
2. ACS Nano 15, 5397 (2021), Harnessing Thermoelectric Puddles via the Stacking Order and Electronic Screening in Graphene
3. Nature Communications 13, 4516 (2022), Atomic-scale thermopower in charge density wave states
4. Manuscript submitted (2024), Thermal biasing for lattice symmetry breaking and topological edge state imaging