Center for Artificial Low D Electronic Systems

2021 Spring Seminar
with CALDES, IBS & SRC, POSTECH

- ✓ **Date&Time:** May 28 (Fri), 3:00PM~
- ✓ **Venue:** Online (Zoom)
- ✓ **Speaker & Title**

1) 3:00PM~ Prof. Ji Hoon Shim (POSTECH)

Evolution of the Kondo lattice electronic structure above the transport coherence temperature

2) 4:10PM~ Prof. Kun Woo Kim (Chung-Ang Univ.)

Discrete-time quantum walks in disorder

Organized by Prof. Jun Sung Kim (js.kim@postech.ac.kr, 054-279-2098)
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- **3:00PM~**

Evolution of the Kondo lattice electronic structure above the transport coherence temperature

Ji Hoon Shim
Dept. of Chemistry & Physics, POSTECH

The temperature-dependent evolution of the Kondo lattice is a long-standing topic of theoretical and experimental investigation and yet it lacks a truly microscopic description of the relation of the basic f-d hybridization processes to the fundamental temperature scales of Kondo screening and Fermi-liquid lattice coherence. In this talk, the temperature-dependence of f-d hybridized band dispersions and Fermi-energy f spectral weight in the Kondo lattice system CeCoIn5 is investigated using first principles dynamical mean field theory (DMFT) calculations containing full realism of crystalline electric field states. All the calculated results are directly compared to f-resonant angle-resolved photoemission (ARPES). Our results reveal f participation in the Fermi surface at temperatures much higher than the lattice coherence temperature, $T* \approx 45$ K, commonly believed to be the onset for such behavior. The identification of a T-dependent crystalline electric field will be discussed with its contribution to T^* as well as local Kondo temperature T^K.

References

[1] Sooyoung Jang, J. D. Denlinger, J. W. Allen, V. S. Zapf, M. B. Maple, Jae Nyeong Kim, Bo Gyu Jang, Ji Hoon Shim, PNAS 117, 23467 (2020).

- **4:10PM~**

Discrete-time quantum walks in disorder

Kun Woo Kim
Dept. of Physics, Chung-Ang University

Floquet condensed matter systems drew extensive attention since the theoretical proposal of shining light on graphene to turn it into an anomalous quantum hall system. The idea of light-induced spin-orbit coupling is further explored to invent novel topological phases uniquely accessible in Floquet systems. In this talk I will present a discrete-time quantum walk setting which is closely connected to the physics of Floquet systems. In particular, the topological phase transition of a chiral symmetric 1D quantum walk and its experimental proposal in linear optical networks will be first discussed. Next, the realization of topological metallic surface states will be introduced in a similar 1D quantum walk setting, but with a time-dependent quantum walk operator to utilize synthetic dimensions.