



# Understanding the strongly correlated features of the electronic structure of twisted bilayer graphene from the pseudo Landau level picture

Date: ~~March 1, 2023 (Wednesday)~~ **March 8, 2023 (Wednesday)**

Time: 5:00 p.m.

Venue: ~~KKLG102, LG1/F, K.K. Leung Building, HKU~~  
**CYPP3, LG1, Chong Yuet Ming Physics Building, HKU**

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**HKUST**



## Abstract:

In the present colloquium, I will introduce how the flat bands in the magic angle twisted bilayer graphene (MATBG) can be understood from the zeroth Landau levels under the twisting generated pseudo magnetic field. These pseudo Landau level wave functions are almost the exact Eigen solutions of the real space Hamiltonian around the AA stacking center and can be further viewed as the analog of the “atomic core level” states in the band structure calculations for the ordinary crystals. In addition, we can use the pseudo zeroth Landau level (PZLL) and the “orthogonalised plane waves” (OPW) made from the PZLL as the two types of basis functions to efficiently reconstruct the entire Moire band structure. Using these PZLL and OPW basis functions, we can describe both the localised and itinerant components in the Moire bands of MATBG and map the MATBG to a “heavy fermion” like system, which can be used to study the orbital magnetism, topology and strongly correlation physics in MATBG.

## Biography:

Professor Xi Dai obtained his Bachelor and Master’s degree (1993 & 1996) from Zhejiang University and PhD (1999) from Institute of Theoretical Physics, CAS in China. After graduation, he did postdoctoral research in HKUST, Boston college and Rutegrs University. From 2004-2007, he worked in University of Hong Kong as a research assistant professor. In 2007, he joined institute of physics, CAS as a professor in the theory division. In September 2017, he joined HKUST as a professor in the Department of Physics. Professor Dai received several important awards during the past ten years including the OCPA “Achievements in Asia Award” (2011), the CAS prize for outstanding scientific achievements and the KC Chou foundation “Fundamental Physics Prize” (2014). He is a Fellow of American Physical Society (APS).

**Anyone interested is welcome to attend!**

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