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**prof. Ming-Hao Liu**

Department of Physics, National Cheng Kung University, Taiwan

Title of the talk: **"Electronic quantum transport simulation for 2D materials"**

Over the past two decades since the discovery of the very first two-dimensional (2D) material: graphene, quantum transport simulation based on the real-space Green's function method within the Landauer-Büttiker framework has shown its power in reproducing and predicting low-temperature transport measurement in the clean limit. This talk starts with a brief introduction to the formalism, including some of the technical details, and then illustrates a few examples of simulating electronic transport in clean samples, possibly including graphene, strained graphene, bilayer graphene, and MoS2. Extra attention will be paid to three of our latest works: Transverse magnetic focusing in graphene proximitized with strong spin-orbit coupling by WSe2 [1], twisted MoS2 bilayer [2], and the four-band effective square lattice model for Bernal-stacked bilayer graphene [3].

[1] Qing Rao, Wun-Hao Kang, Hongxia Xue, Ziqing Ye, Xuemeng Feng, Kenji Watanabe, Takashi Taniguchi, Ning Wang, Ming-Hao Liu & Dong-Keun Ki, Nat. Communs. 14, Article no: 6124 (2023).

[2] Aitor Garcia-Ruiz and Ming-Hao Liu, arXiv:2401.10436.

[3] Szu-Chao Chen, Alina Mreńca-Kolasińska, Ming-Hao Liu, arXiv:2403.03155.