JITCP Seminar

THE UNIVERSITY OF HONG KONG
HKU-UCAS JOINT INSTITUTE OF THEORETICAL AND COMPUTATIONAL PHYSICS
HK INSTITUTE OF QUANTUM SCIENCE & TECHONOLOGY
[Thursday afternoon, 4:00 pm, In Person]

Understanding Mott Physics: Elephant in the Living Room and a Couple of Examples

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In the Landau paradigm, the Fermi statistics is essential to organize the electrons into a condensate of Fermi liquid or BCS superconductivity. However, in a strongly correlated electron system with opening up a Mott gap, the Hilbert space is fundamentally changed with a new sign structure – phase string - emerging to replace the Fermi signs. To illustrate the novel consequences, I will focus on the single-hole [1,2] and two-hole [3] wavefunctions as the simplest possible examples of doped Mott insulators, which can account for all the nontrivial features as measured by exact numerical calculations. These accurate analytic wavefunctions can thus show how the basic physics of a doped Mott insulator is so different from what one would expect from a Landau quasiparticle picture or a BCS pairing mechanism via exchanging bosonic modes. Important implications to understanding the high-TC superconductors will be briefly addressed.

[1] S. Chen, et al., PRB 99, 205128 (2019)
[2] J.-Y. Zhao, et al. PRB 107, 085112 (2023)
[3] J.-Y. Zhao, et al. PRX 12, 011062 (2022)

In Person Seminar

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Room 522, 5/F, Chong Yuet Ming Physics Building,
The University of Hong Kong

Host: Professor Gang CHEN, The University of Hong Kong

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