

Massachusetts Institute of Technology
Department of Physics

Condensed Matter Theory Seminar

" Many-Body Polarization and Its Applications"

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Abstract: Quantum systems on a non-simply connected space possess a "large" gauge invariance. Laughlin utilized this to explain quantum Hall effect. Later, it was applied to elucidate a universal relation between filling factor and energy spectrum in quantum many-body systems on periodic lattices (Lieb-Schultz-Mattis-M.O.-Hastings). Somewhat surprisingly, the large gauge invariance is also deeply related to "modern theory of electric polarization" developed by Resta et al. Combining these ideas together, we can derive a constraint on the Hall conductivity of a many-particle system on a periodic lattice, with a given magnetic flux per plaquette and particle density. I will also report an ongoing work on a potential application of the many-body polarization to distinguish different gapless, conducting phases

Reference: Y.-M. Lu, Y. Ran, M. O., arXiv:1705.09298

3:00pm
Wednesday, November 1, 2017
Duboc Room (4-331)

Host: Itamar Kimchi