

Exciton Condensation in Landau Levels of Quantum Spin Hall Insulators

Abstract: Electron interactions in topological materials are responsible for novel quantum states of matter. In this talk, we theoretically investigate two-dimensional quantum spin Hall insulators in a perpendicular magnetic field, and show that the Coulomb interactions induce an exciton insulator phase in the vicinity of a magnetic field-induced topological quantum critical point. This exciton insulating phase spontaneously breaks the spin rotation and space inversion symmetry. We propose that the electron spin resonance (ESR) experiment can probe this exciton insulator phase, and discuss its possible applications to the InAs/GaSb quantum wells.

References:

H.-M. Peng, Z. Wang, and L. Zhang, arXiv:2403.04691.



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时 间 | 2024.11.18 15:30

地 点 | 科技楼A311

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