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Topological Fermi-liquid theory: Dynamics of collective modes and their instabilities in Weyl metals (Role of emergent axions in interacting Weyl metals)

Friday 1 September 2023 09:00 (45 minutes)

1. Introduction of topological classification of electronic band structure based on historical perspectives: Paper reviews 2. Emergent axions in ferromagnetic Weyl metals, antiferromagnetic topological insulators, and superconducting Weyl metals: From microscopic lattice models to effective field theories with symmetry breaking → Novel non-equilibrium phase transitions
2. Introduction of Berry curvature into Landau's Fermi-liquid theory = Topological Fermi-liquid theory (Haldane): Dynamics of $l=1$ & $l=2$ collective modes and their instabilities in interacting Weyl metals
3. Role of effective axion dynamics in potential instabilities of topological Fermi liquid theory: Generalization of composite Fermion theory in two spatial dimensions (From EM CS + gravitational CS + Wen-Zee CS to EM θ + gravitational θ + mixed anomaly θ terms)

Presenter: Prof. KIM, Ki-Seok (POSTECH)