

Electronic instabilities in kagomé metals AV_3Sb_5

A recently discovered family of Kagome metals AV_3Sb_5 ($A=K, Rb, Cs$) has attracted a lot of theoretical and experimental interests. Remarkably, a cascade of phase transitions as temperature lowers, from charge order, potential time reversal symmetry breaking order, rotational symmetry breaking order to superconductivity, was observed. I will present a theory of charge ordering as electronic instabilities in Kagome metals near van-hove filling. From a renormalization group study, I show that either time-reversal even or odd charge order may be the leading electronic instabilities. Next, I will discuss the consequences of each scenario and the constraints on the theory space from various experiments. I will conclude with an outlook on the implications of our theory towards a unified theory for the cascade of phase transitions.

Based on

1. Park, Ye, Balents, Phys. Rev. B 104, 035142 (2021)
2. Zhao, Li, Ortiz, Teicher, Park, Ye, Wang, Balents, Wilson, Zeljkovic, Nature 599, 216 (2021)
3. Li, Zhao, Ortiz, Park, Ye, Balents, Wang, Wilson, Zeljkovic, Nature Physics (2022)