

## Competing Orders Driven by Wigner Crystal Phase in Rhombohedral Graphene

Zekang Zhou

*EPFL*

Rhombohedral graphene systems provide a unique platform where strong electronic interactions and nontrivial band topology coexist at low carrier densities and high displacement fields, giving rise to a rich landscape of emergent electronic phases. Here, we report that the highly insulating state on the low-density side of chiral superconductivity in rhombohedral pentalayer graphene (R5G) corresponds to a Wigner crystal (WC) phase. Under an out-of-plane magnetic field, the system hosts competing magnetic-field-stabilized superconductivity (fSC) and unconventional reentrant quantum Hall (RIQH) states. These emergent phases are closely connected to the underlying WC. Our results establish that WC phase plays an important role in the phase diagram of rhombohedral multilayer graphene and highlight its connection to a rich landscape of emergent phases.