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Emergence of Topological Interface States at Chern Insulator Junctions: Complete Mode-Mixing and Gate-Tunable Beam Splitting¹ NOJOON MYOUNG, HEE CHUL PARK, Institute for Basic Science — Chern insulator junctions have introduced by using p-n junctions in graphene quantum Hall systems, which are characterized by different Chern numbers. It is theoretically demonstrated that topological states emerge at the interface of the Chern insulator junctions. The existence of the topological interface states are interpreted by the bulk-boundary correspondence of topological matters, indicating their number of states are the same as the Chern number difference between two Chern insulators. Interestingly, it is revealed that there is the intriguing splitting nature of the topological interface states via four-terminal conductance calculations. As a consequence of the mode-mixing of the topological states at junctions, the quantum Hall conductance is split into two opposite directions at the system boundary, satisfying the flux conservation. Such splitting nature is sensitively dependent on the size of system, resulting from the width-dependent electronic states for armchair edge terminations. Further, it is also investigated that how the topological interface states are robust against realistic p-n junctions, i.e., smoothly varying potentials instead of the abrupt step potential. As expected, the topological states still exist at smooth junctions

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