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Gate-induced edge-state gap opening in an irradiated graphene nano-ribbon LI CHANG, C.S. CHU, Department of Electrophysics, National Chiao Tung University, Taiwan — Graphene undergoes topological phase transition when irradiated by a circularly polarized light. Dispersive helical edge states in both zigzag and armchair graphene nano-ribbons (ZGNR/AGNR) are the signatures. It is of interest to drive the system out-of the edge-state regime by electrical means. To this end, we propose a gate-potential configuration that covers part of the ribbon. For the case of ZGNR, the gate potential is shown to tune the degree of hybridization between edge states formed at opposite edges of the ribbon, leading eventually to edge-state gap opening. For the case of AGNR, the gate potential is less effective. The physics behind our findings will be discussed and supported by both numerical and analytical analysis.

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