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Low-gate-biased edge-state manipulation for turnable spin-polarized current source in zigzag graphene ribbon LI CHANG, CHON-SAAR CHU, Department of Electrophysics, National Chiao-Tung University — In this work, we investigate the spin transport through a region with inhomogeneous edge-potential generated by split gates in a zigzag graphene ribbon (ZGNR). The split gates (each covers the lower and upper edges of the ribbon) actively modify the coupling between the pair of edge states and electrically generate the tunable edge-sate gap (ESG). With a homogeneous exchange field in the whole background, the ESGs of opposite spins are separated. We utilize these separated gaps to realize the tunable spin-polarized current source. Specifically, the split gates are placed in the middle segment of the ZGNR and we numerically study the spin transport through the potential region. With the exchange field strength of 5 meV and the on-site energy uncertainty within ± 4 meV, we still get nearly 100% spin polarized current.

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