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Valley-dependent resonant inelastic transmission through a time-modulated region in graphene C.S. CHU, L. CHANG, T.L. LIU, Department of Electrophysics, National Chiao Tung University, Taiwan — Valley-dependent transmission is one of the key physical characteristics for valleytronics. In this work, we focus upon the valley-dependent nature of the quantum transport through a time-modulated-potential region in graphene, when the incident flow is collimated, with a given group velocity direction. Of particular interest is the interplay between the resonant sideband process and the trigonal-warping. The former causes transmission dip-structures which condition of occurrence is determined by sideband processes to a relevant band edge. The latter causes the relevant band-edge energy to become valley-dependent. The relevant band is a fixed-k_y projection of the graphene energy band, where k_y (along the time-modulate region interface) is conserved in the transmission. The valley polarization$P$ in the transmission, for valley-unpolarized incident collimated beam, is calculated. Based on our understanding on the above valley-dependent nature, ways to optimize P will be discussed.

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