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Coherent interband transport in binary zigzag optical waveguide arrays¹ KIN CHUNG AU YEUNG, NAI JING DENG, CHEUNG WAI CHAU, SAI KIT YUNG, KIN WAH YU, The Chinese University of Hong Kong — We have studied the optical oscillation and Zener tunneling of light waves in binary zigzag optical waveguide arrays in which the evanescent coupling in the array is included up to the second order. By tuning the ratio of the first order and second order coupling strengths, there is a miniband-minigap structure in the dispersion diagram. Moreover, by adding a gradient in the propagation constant transverse to propagation, Bloch-Zener oscillation (BZO) and Zener tunneling between two bands can be realized. The occurrence of BZO and Zener tunneling is simulated by the field-evolution analysis using an input Gaussian beam. Through a visual band picture, the simulation results confirm the band structure of the waveguide arrays. A rate equation is proposed to understand the coherent transport behaviors between the two minibands across the gap.

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