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**Steering between Bloch oscillation and dipole oscillation in parabolically graded optical waveguide arrays** Y.S. CHAN, M.J. ZHENG, K.W. YU, The Chinese University of Hong Kong — We study optical oscillations of supermodes in planar optical waveguide arrays with parabolically graded propagation constant in individual waveguide interacting through nearest neighbor couplings. The gradient in the propagation constants can be achieved conveniently by electro-optic effects. For these arrays, we have identified a symmetric dipole oscillation (DO) as well as a symmetry-breaking Bloch oscillation (BO) under appropriate conditions. Moreover, in analogy to a harmonic oscillator under gravity, we propose a lift and shift of the graded profile to cause a transition from DO to BO. The amount of lift and shift can be achieved by additional electro-optic effects. We confirm the optical transition by means of semiclassical theory, as well as the field evolution of the supermode modes. The results offer great potential applications in optical switching, which can be applied to design suitable optical devices.

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