

Abstract Submitted
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Harmonic Bloch and dipole oscillations and their transition in elliptical optical waveguide arrays¹ YUN SAN CHAN, MING JIE ZHENG², KIN WAH YU, The Chinese University of Hong Kong — We have studied harmonic oscillations in an elliptical optical waveguide array in which the couplings between neighboring waveguides are varied in accord with a Kac matrix so that the propagation constant eigenvalues can take equally spaced values. As a result, the long-living optical Bloch oscillation (BO) and dipole oscillation (DO) are obtained. Moreover, when a linear gradient in the propagation constant is applied, we achieve a switching from DO to BO and vice versa by ramping up or down the gradient profile [1]. The various optical oscillations as well as their switching are investigated by field evolution analysis and confirmed by Hamiltonian optics. The equally spaced eigenvalues in the propagation constant allow viable applications in transmitting images, switching and routing of optical signals.

[1]. M. J. Zheng, Y. S. Chan and K. W. Yu, *J. Opt. Soc. Am. B* 27, 1299 (2010).

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²Now in University of Wisconsin - Madison

Yun San Chan
The Chinese University of Hong Kong

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