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Period doubling and the growth of swallowtails in Bose-Einstein condensates trapped in a lattice potential BRIAN SEAMAN, LINCOLN CARR, MURRAY HOLLAND, JILA, University of Colorado — The band structure for a Bose-Einstein condensate on a lattice is shown to be both qualitatively and quantitatively independent of the exact structure of the underlying lattice by examining sinusoidal, Jacobi elliptic, and Kronig-Penney potentials. The appearance of swallowtails in the band structure is then analyzed in terms of the adiabatic growth of a shorter period lattice using analytic period doubled solutions of a Kronig-Penney potential. Since the results are independent of the potential used, these properties hold for the experimental sinusoidal potential as well.

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