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Title:Demonstration of photon Bloch oscillations and Wannier-Stark ladders in dual-periodical multilayer structures based on porous silicon
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Abstract:Theoretical demonstration and experimental evidence of photon Bloch oscillations and Wannier-Stark ladders (WSLs) in dual-periodical (DP) multilayers, based on porous silicon, are presented. An introduction of the linear gradient in refractive indices in DP structure, which is composed by stacking two different periodic substructures N times, resulted in the appearance of WSLs. Theoretical time-resolved reflection spectrum shows the photon Bloch oscillations with a period of 130 fs. Depending on the values of the structural parameters, one can observe the WSLs in the near infrared or visible region which may allow the generation of terahertz radiation with a potential applications in several fields like imaging. © 2012 Estevez et al.
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