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Quasienergy resonance in a dynamicWannier-Stark ladder YUYA NEMOTO, Graduate School of Pure and Applied Sciences, University of Tsukuba, KEN-ICHI HINO, NOBUYA MAESHIMA, Division of Materials Science, Faculty of Pure and Applied Sciences, University of Tsukuba — A continuum effect of a dynamic Wannier-Stark ladder driven by a cw laser is examined in terms of an excess density of states (EDOS), corresponding to the lifetime of a resonance state [1]. It is mathematically shown that EDOS is governed by three different physical mechanisms, namely, the single-channel resonance mechanism, the multichannel nonresonance mechanism, and the multichannel resonance mechanism. The last mechanism becomes more important with increasing laser amplitude F_{ac}. The effect of the interchannel interaction is maximized when the ratio of a Bloch frequency to a laser frequency, represented as η, equals unity. In the actual calculations based on the R-matrix Floquet theory, it is revealed that, in a large-F_{ac}region, EDOS for $\eta = 1$ shows a complicated spectral structure composed of a couple of newly growing peaks, in contrast to EDOS for $\eta = 3$ which just shows a monotonic change of a single spectral peak. It is speculated that the pronounced feature of the former spectra is attributed to the Fano-like multichannel resonance mechanism, whereas the feature of the latter case is attributed to the multichannel nonresonance mechanism.
[1] Y. Nemoto, K. Hino, and N. Maeshima, Phys. Rev. B 87, 205305 (2013).

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