

A theory of generalized Bloch oscillations - DTU Orbit (09/11/2017)

A theory of generalized Bloch oscillations

Bloch oscillations of electrons are shown to occur for cases when the energy spectrum does not consist of the traditional evenly-spaced ladders and the potential gradient does not result from an external electric field. A theory of such generalized Bloch oscillations is presented and an exact calculation is given to confirm this phenomenon. Our results allow for a greater freedom of design for experimentally observing Bloch oscillations. For strongly coupled oscillator systems displaying Bloch oscillations, it is further demonstrated that reordering of oscillators leads to destruction of Bloch oscillations. We stipulate that the presented theory of generalized Bloch oscillations can be extended to other systems such as acoustics and photonics.

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