Algebraic dynamics of Bloch oscillations of ultra - cold atoms in optical lattice

H Pahlavani and A Zamani
Department of Physics, University of Qom, Qom, Iran
E-mail: h-pahlavani@qom.ac.ir

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Abstract
The dynamic of a charged quantum particle in a system of arrays of quantum well in tight-binding model, under the effect an external field, in one and two dimension, is studied by algebraic approach. The persistent (quantum confinement) and transmission (quantum teleportation) probabilities of this quantum particle in terms of infinite-variable Bessel functions is calculated and the results is discussed by numerical method.

Keywords: tight-binding model, Lie algebra, persistent probability, transmission probability