

Abstract Submitted  
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**Landau-Zener Tunneling in 1-d periodic potential** JIAJUN LI, JONG HAN, SUNY at Buffalo — Landau-Zener tunneling can be used to model the transition between energy bands of a particle in 1-d periodic potential [1-2]. It is pointed out that a specific model could be utilized to explain the transition driven by a uniform external force, between energy bands in a periodic lattice [3]. Here we examine the transition driven by an external force, in a sinusoidal periodic potential, by solving Schrödinger equation numerically. As an exact solution, all bands and transitions between them are included. By considering arbitrary crystal potential of any supercell size, we can approximate random potential scattering and examine how random elastic scattering modifies the inter-band transition and eventually the electron transport. Non-exponential decays and other patterns for different ranges of parameters will be presented. We will also make a connection between the numerical results and conventional Landau-Zener transition model, and show how a time-dependent periodic potential will change the nature of transition. Supported by NSF.

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[3] Q. Niu and M. G. Raizen, Phys. Rev. Lett. 80, 3491(1998)

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