

# Dynamics of wave packets under electric fields

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Using a 1D tight-binding model, we study the evolution of a well-localized wavepacket of Bloch states under an applied electric field. We apply a novel algorithm (along the lines of Ref.[1]) for solving numerically the equations of motion which does not rely on the single-band approximation and can thus be used to explore interband Zener tunneling effects. In addition to the well-known Bloch oscillations of the center of the packet, we show that as the waveform moves in  $k$ -space, its real-space width varies in response to the change in the local quantum metric,  $g(k)$ , of the underlying Bloch states [2].

[1] I. Souza, J. Iñiguez and D. Vanderbilt, Phys. Rev. B **69**, 085106 (2004)

[2] N. Marzari and D. Vanderbilt, Phys. Rev. B **56**, 12 847 (1997).