Dynamics of wave packets under electric fields

Miguel Pruneda and Ivo Souza

Department of Physics, UC Berkeley
Berkeley, California, USA

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].