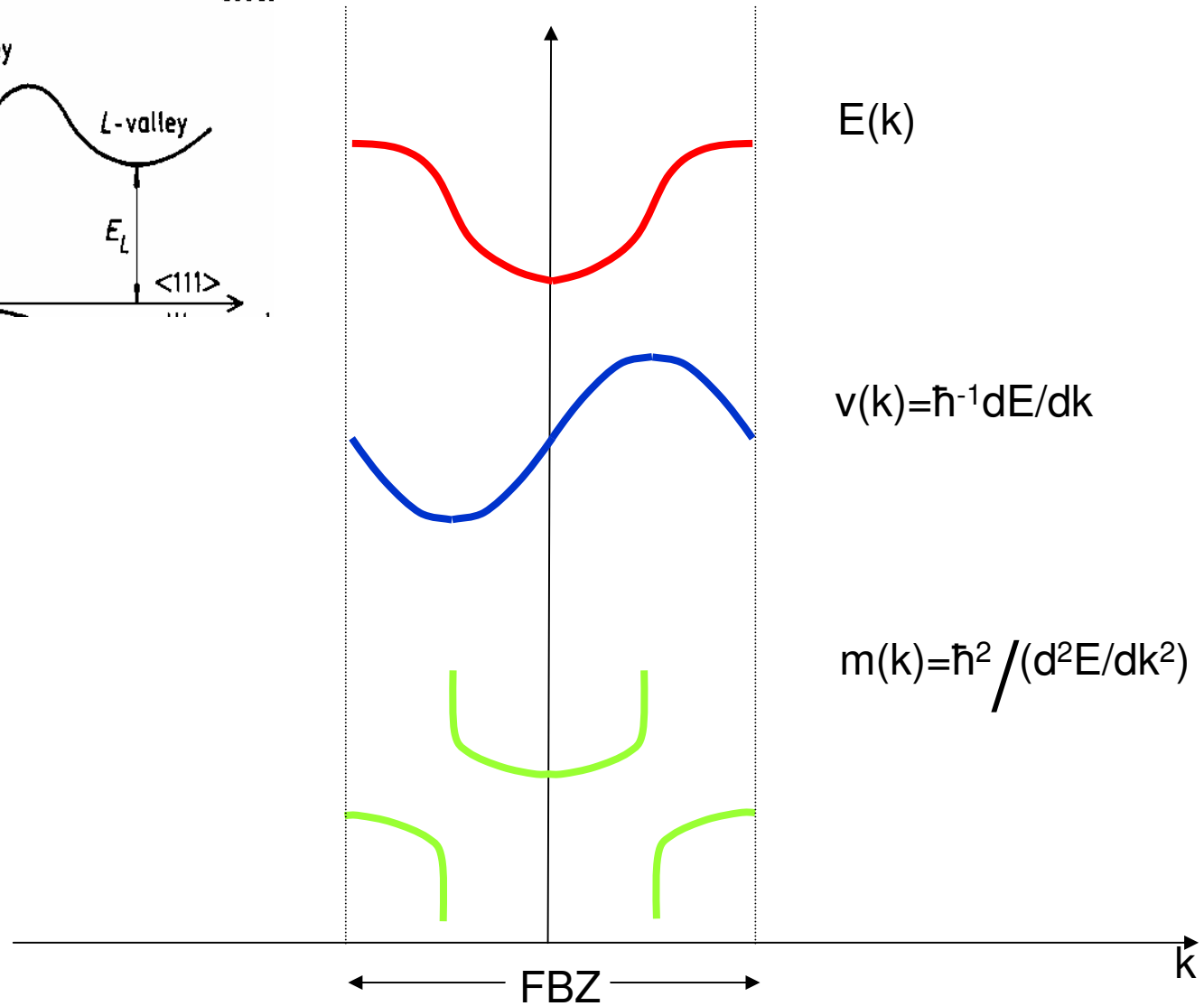
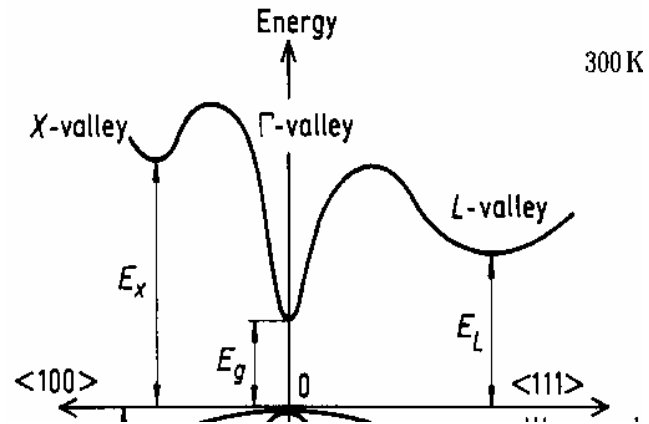
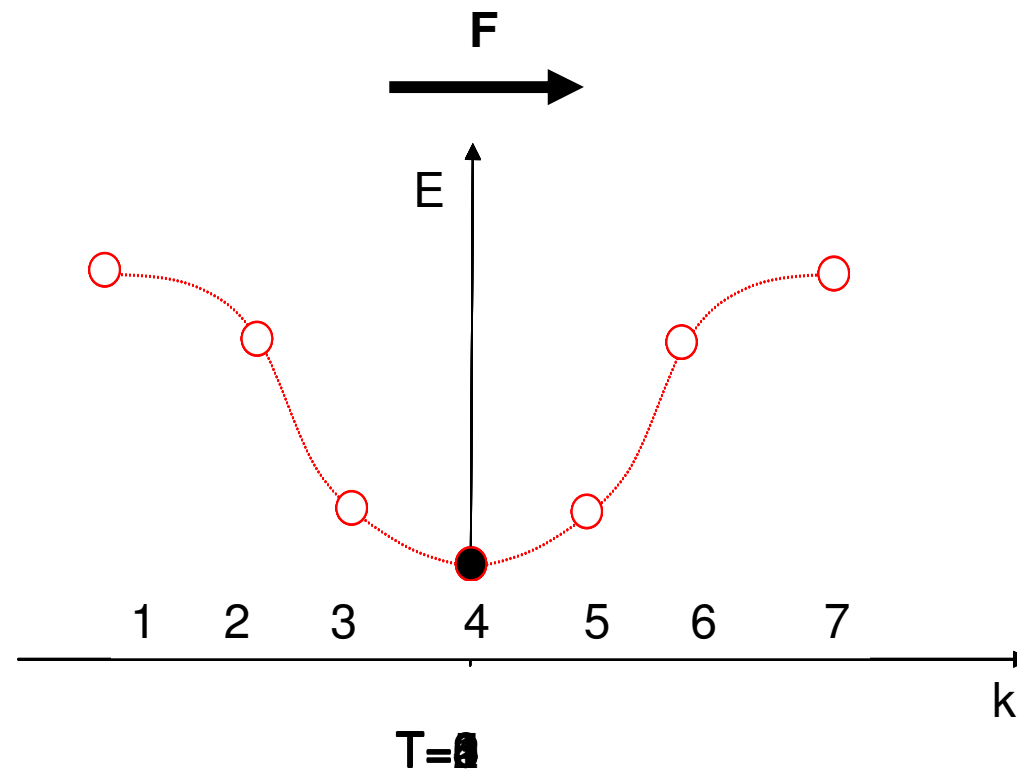


Sommario

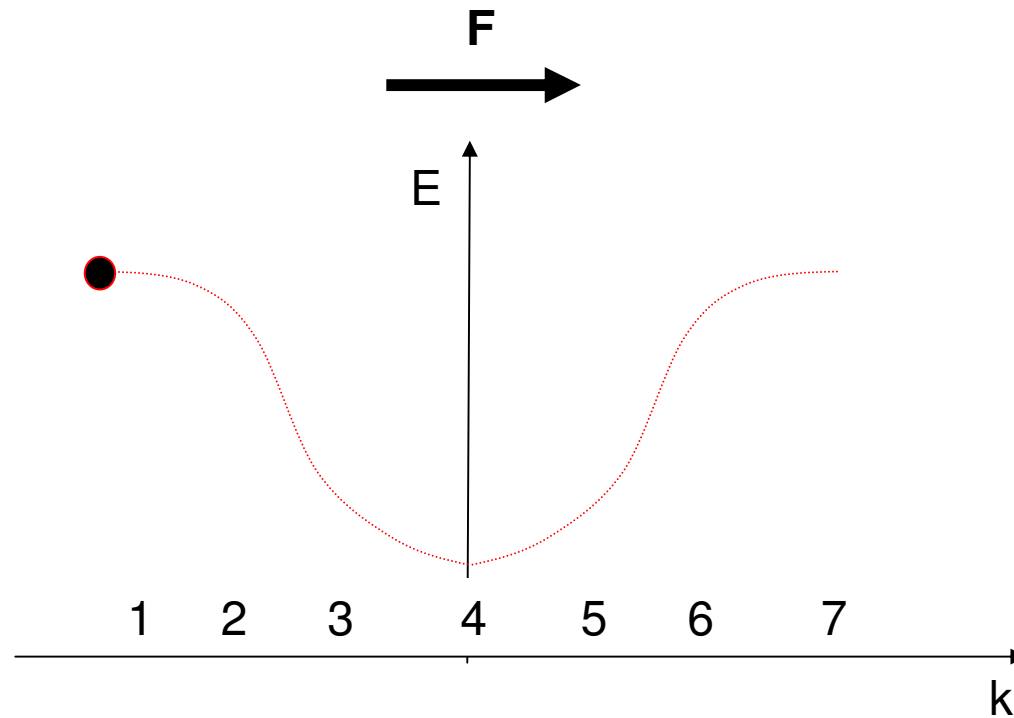


Moto in presenza di una forza esterna

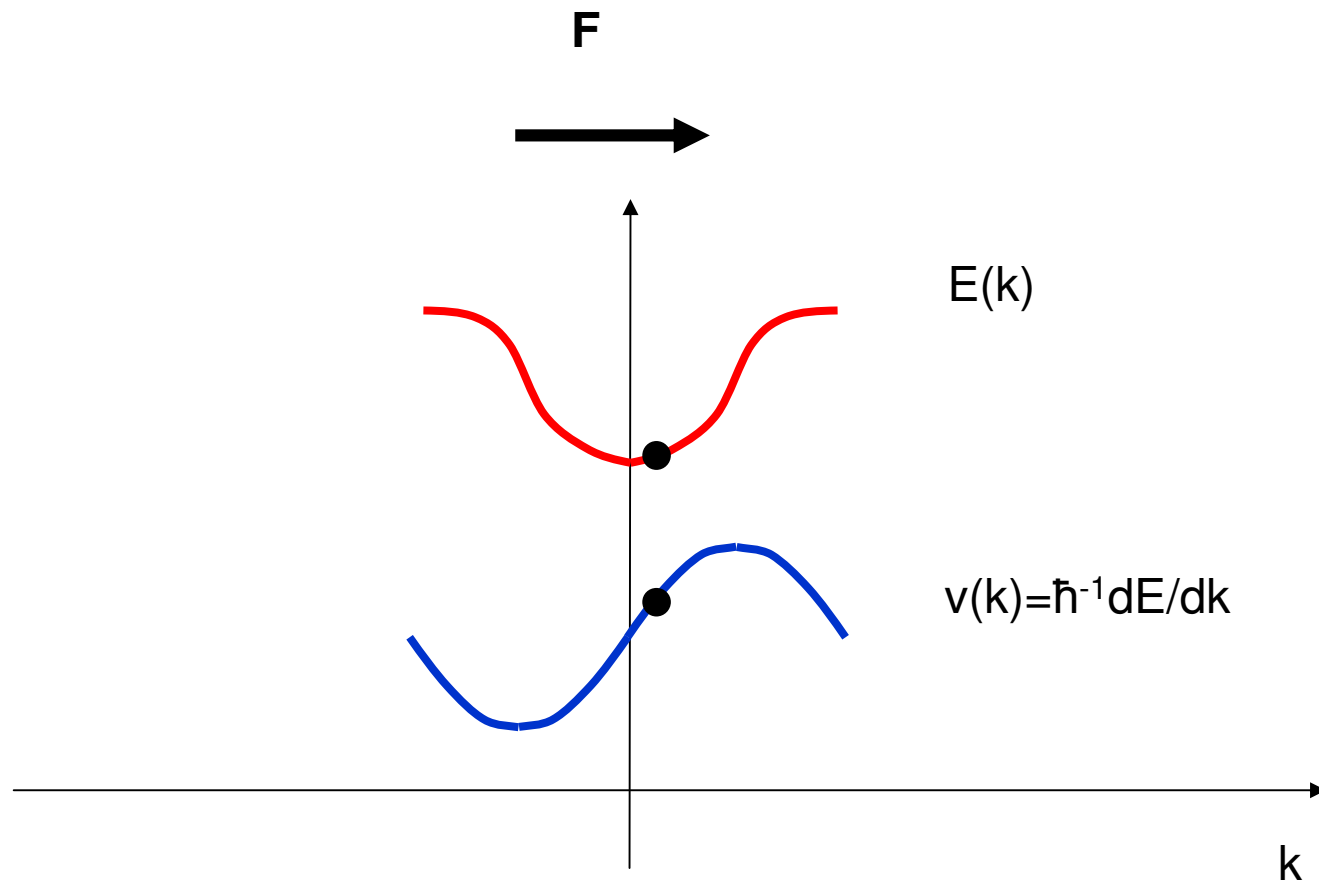


Moto in presenza di una forza esterna

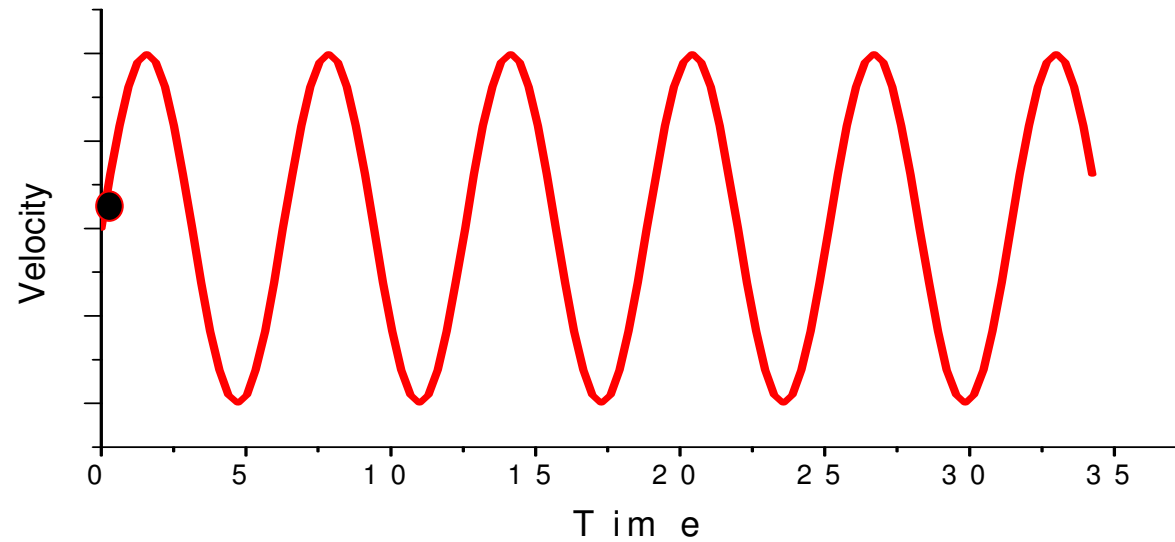
Oscillazioni di Bloch: lo stato cambia in modo periodico



Cosa succede al moto reale dell'elettrone



La velocità è una funzione periodica del tempo



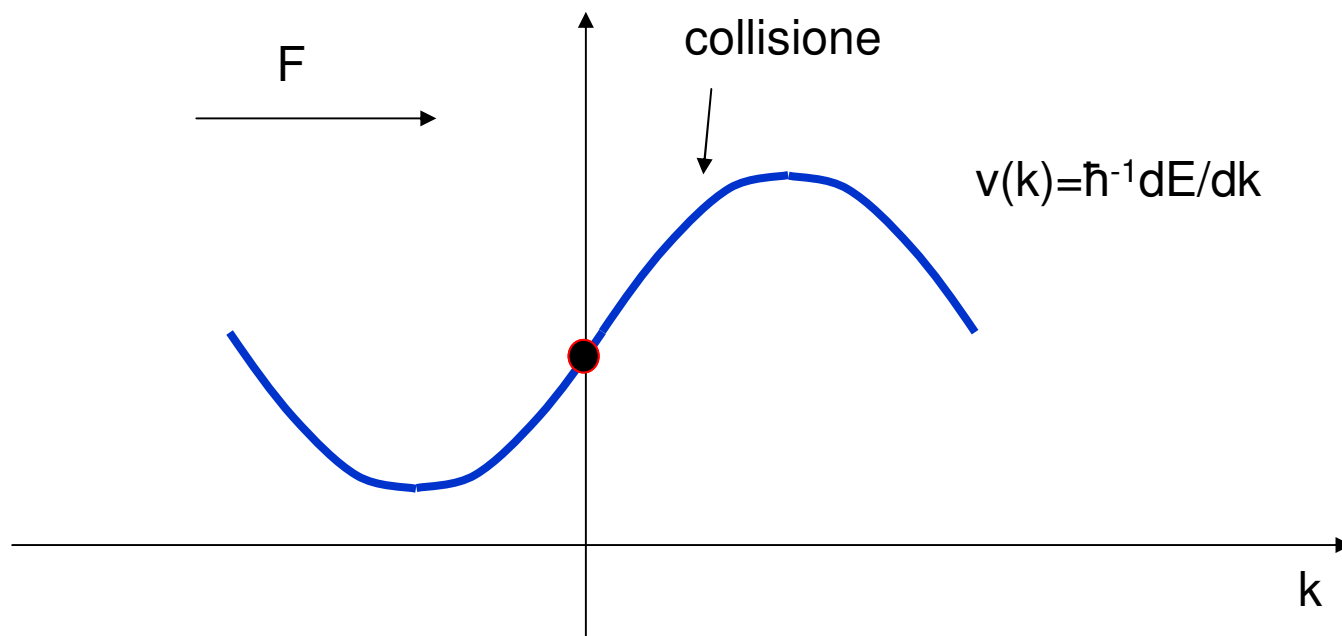
La posizione è una funzione periodica del tempo



Oscillazioni di Bloch: tensione continua, corrente oscillante

NON SI
OSSERVANO

Meccanismo di damping

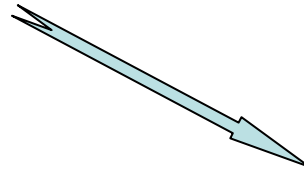


Valori numerici

$$FT_B = \hbar 2\pi / a$$

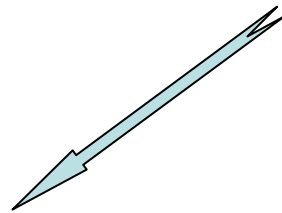
$$T_B = \hbar 2\pi / (aF) = \hbar 2\pi / (eEa)$$

$$E = 1000\text{V}/1\text{mm} = 10^6\text{V/m}$$

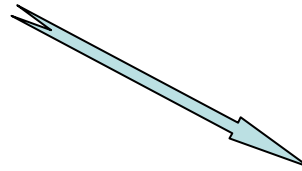


$$T_B = (6.6 \cdot 10^{-34} / (1.6 \cdot 10^{-19} \cdot 10^6 \cdot 0.5 \cdot 10^{-9})) \text{ sec} = 8 \cdot 10^{-12} \text{ sec}$$

$$\tau_C = 10^{-13} \text{ sec}$$

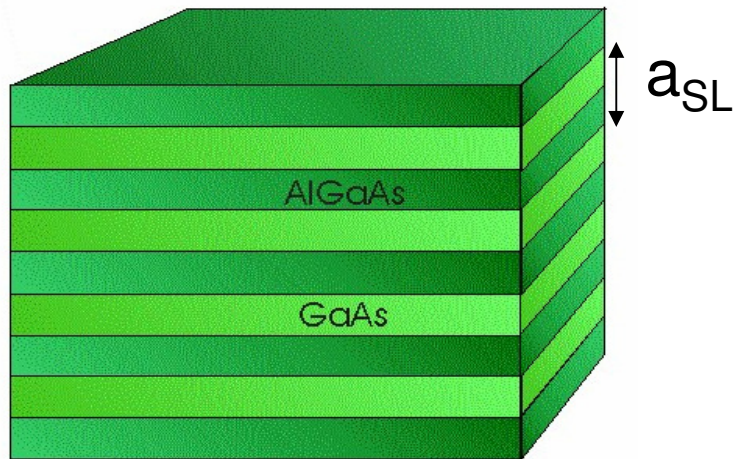


$$E > 8 \cdot 10^7 \text{V/m}$$



$$a > 40 \text{ nm}$$

Sperimentalmente è stato visto in super reticoli
spontaneous current oscillations



A Superlattice Structure

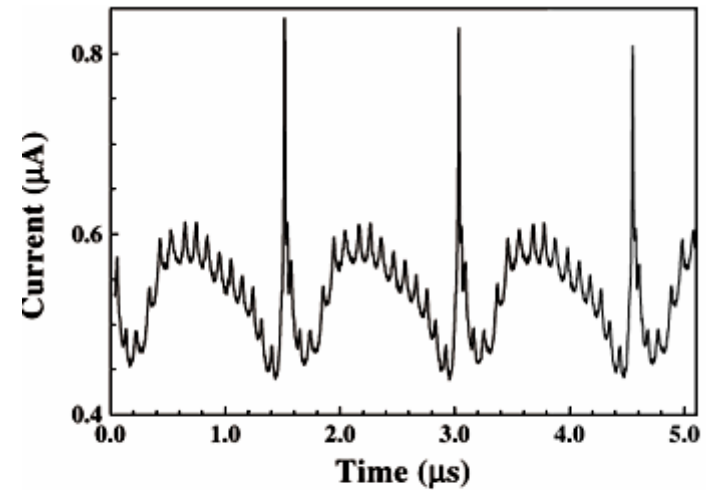
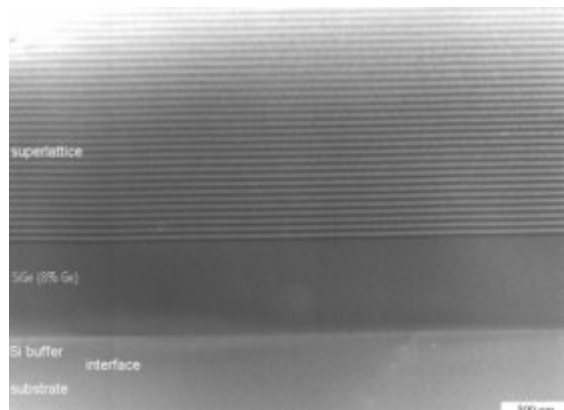


Figure 2. Spontaneous current oscillations in a doped SL with 40 periods, 9.0 nm GaAs wells, and 4.0 nm AlAs barriers for an applied voltage of 2.77 V and a temperature of 6 K. There are 16 spikes in a single period of the 0.65 MHz oscillations.