(the reason for leaving the term $2t^2$ in ε_2 and ε_4 is its dependance on k_z). At the first glance there are two finite gaps. However since $t(k_z) = t\cos(k_z d)$ the second gap vanishes at the boundaries of the Brillouin zone: $k_z \to \pi/2d$ or $k_z \to -\pi/2d$.

In the (ZZ) geometry the scattering is defined by the A_z component of the vector potential. In the tight-binding model it enters the wave functions through the factors

$$\exp\left(-i\frac{e}{c}\int^{z} A_z\, dz\right)$$

therefore if ψ and ψ^+ appear with the same argument, the factors are canceled out, and the only terms in the Hamiltonian containing A_z are the hopping terms. They contain factors of the type

$$\exp\left(\pm\frac{ie}{c}\int_{2md}^{(2m+1)d} A_z dz\right),$$

and assuming that A_z doesn't vary noticeably at atomic distances these factors can be replaced by

$$\exp\left[\pm\frac{ied}{c}A_z(2md)\right] . \qquad (7)$$

The result is that in the hopping terms k_z are replaced by $k_z - (e/c)A_z$.

Omitting the detailes of calculations and formulas, the final answer can be illustrated by Fig.2.

Fig. 2. Electronic Raman scattering cross-section for the geometry X(ZZ)$\bar{X}$