**HW 1**

EE

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1.

The velocity,

.

And, the velocity must be equal to zero at the zone edge, because the slope of the dispersions is zero at the zone edge.

Therefore,

2. Consider the “free” electron energy bands of an fcc crystal lattice.

When band energies are approximated well by free electron energy,

.

In the [111] direction,

.

Then, the reciprocal lattice vector is

Substitute to the energy equation.

Along the [111] direction

|  |  |
| --- | --- |
| (n1n2n3) | Energy |
| (000) |  |
| (1), (1), () |  |
| (11), (11), (11) |  |
| (00), (0), (00), |  |
| (002), (020), (200) |  |
| (111) |  |
| () |  |

