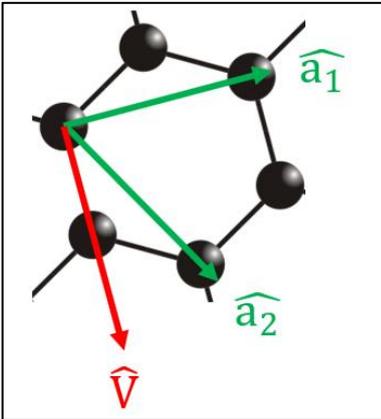# HW1

1. Let $\hat{V} = C_1\hat{a_1} + C_2\hat{a_2}$; Find C_1 ; C_2

2. <u>Introduction to Solid State Physics , 8th by Charles Kittel , p10 , problem 1</u>

3. <u>Introduction to Solid State Physics , 8th by Charles Kittel , p10 , problem 2</u>

4. <u>Introduction to Solid State Physics , 8th by Charles Kittel , p10 , problem 3</u>

HW2

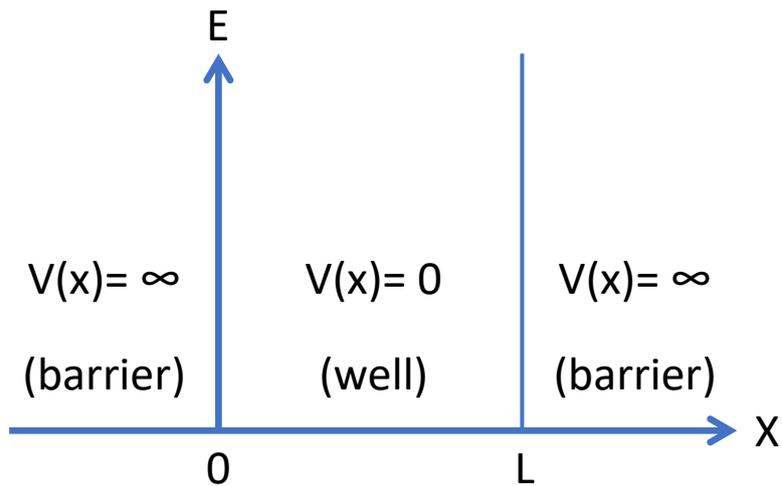1. 求 BCC 及 FCC 的

(a)　Primitive Lattice Vectors

(b)　Reciprocal Lattice Vectors
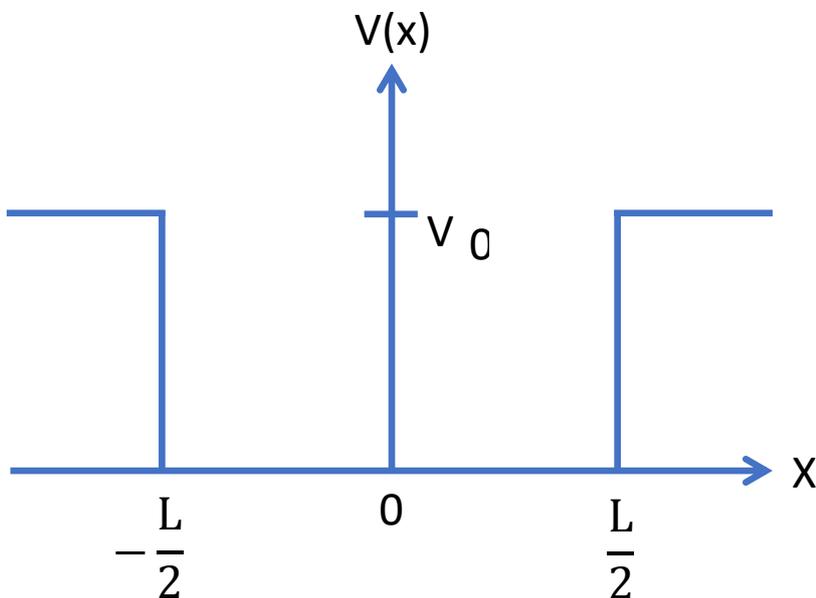
2. 證明Diffraction Condition：

　　$\Delta k = \vec{G}$ 與 $2d \cdot Sin\theta = n\lambda$ 之間的關係

HW3

1. Introduction to Solid State Physics , 8th by Charles Kittel , p43 , problem 1

2. Introduction to Solid State Physics , 8th by Charles Kittel , p44 , problem 5

3. Solve **Infinite Square Potential Well**

4. Solve **Finite Square Potential Well**

HW4

1. 名詞解釋

(a) Cohesive Energy

(b) Electron Affinity

(c) Ionization Energy

2. Introduction to Solid State Physics , 8th by Charles Kittel , p86 , problem 2

3. Introduction to Solid State Physics , 8th by Charles Kittel , p86 , problem 5

HW5

1. Introduction to Solid State Physics , 8th by Charles Kittel , p103 , problem 5

2. If there are three atoms in a primitive cell, then how many branches of LA, LO, TA and TO phonons can be found in the dispersive relation.

3. Please explain why the optical branch of phonon dispersive relation was named as "optical" branch ?

4. How to get the sound velocity of a material from the dispersive relation of phonon, (w,k) structure in a lattice dynamics ?

5. 求 3D_k-space 的能態密度函數