

Answer on Question #51232, Physics, Solid State Physics

What is the Bravais lattice formed by all lattice points which have the Cartesian coordinates (x,y,z) such that

- i) x,y and z are all even numbers
- ii) x,y and z are either all even numbers or all odd numbers.

Answer:

- I) If the (x, y, z) are all even, the lattice will be simple cubic with lattice constants $a = 2$.
- II) If the (x, y, z) are all even or all odd, the lattice will be body-centered cubic with lattice constants $a = 2$. Indeed, if we shift the lattice in part (I) as $(x, y, z) \rightarrow (x+1, y+1, z+1)$, we will get a lattice with (x, y, z) all odd, and each new lattice point is in the center of the cubic of old lattice; hence we obtain a body-centered cubic lattice.