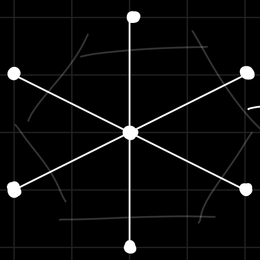
Wigner-Seitz cell → another primitive cell in the real space

In real space →



draw the line between the nearest neigbour basis taking the least length and then take the perpendicular bisection of those lines and you will get the Wigner Seitz cell

Reciprocal Lattice

(= fourier space / K space / momentum space)

Electronic number density = $n(r)$ in the crystal is periodic

$n(r) = n(r+R)$ → R: primitive unit vector = period

R equal to a direct lattice translational vector :

$$R = u\bar{a} + v\bar{b} + w\bar{c}$$

u, v, w → numbers (const)

$n(r)$ can be expressed as a fourier series

$$n(r) = \sum_G n_G e^{ikr}$$

where $n_G = \frac{1}{V_c} \int_0^a dV\, n(r) e^{-ikr}$

where $\bar{k}$ ≡ Reciprocal Lattice vectors

reciprocal Lattice represents the fourier transform of another Lattice like Bravais Lattice in real space

$\boxed{\bar{K} \cdot \bar{R} = 2\pi \delta_{ij}}$ ← $e^{ikr} = 1$

for unique $\bar{R}$, we have unique $\bar{k}$