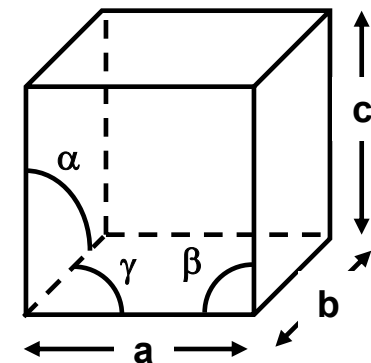


Seven unique Bravais lattice classes based on point symmetry
(subset of 14 total unique Bravais lattices)

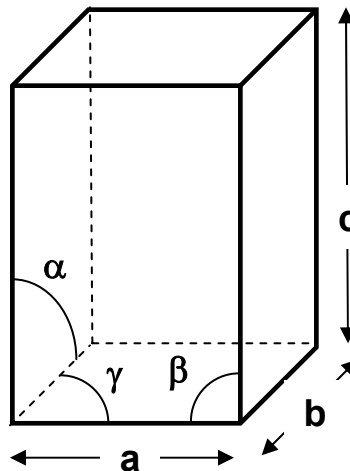
- First six can be obtained by stretching or shearing the unit cube

Cubic



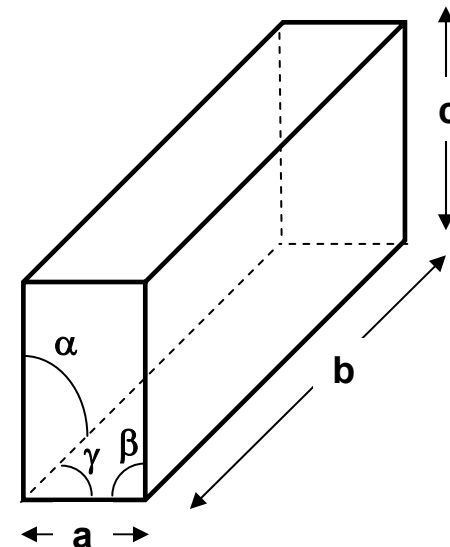
$$a = b = c$$
$$\alpha = \beta = \gamma = 90^\circ$$

Tetragonal
(stretching along one axis)



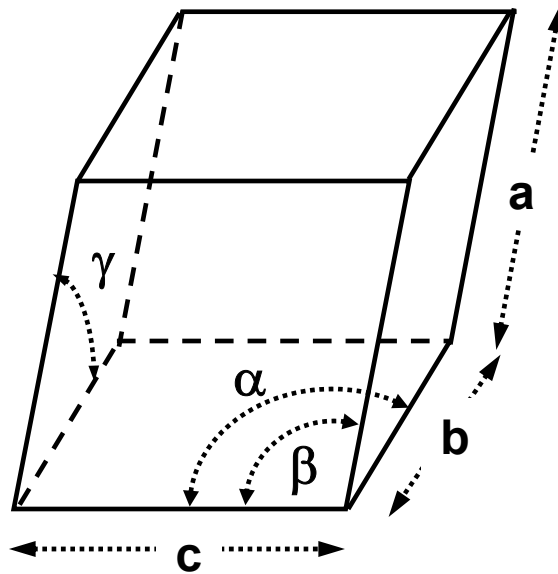
$$a = b \neq c$$
$$\alpha = \beta = \gamma = 90^\circ$$

Orthorhombic
(stretching along two axes)



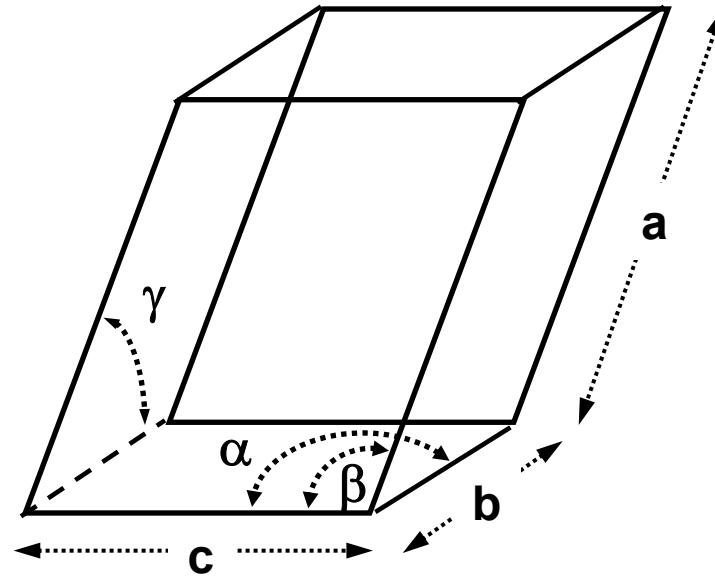
$$a \neq b \neq c$$
$$\alpha = \beta = \gamma = 90^\circ$$

Monoclinic (six sided)
(by shearing once)



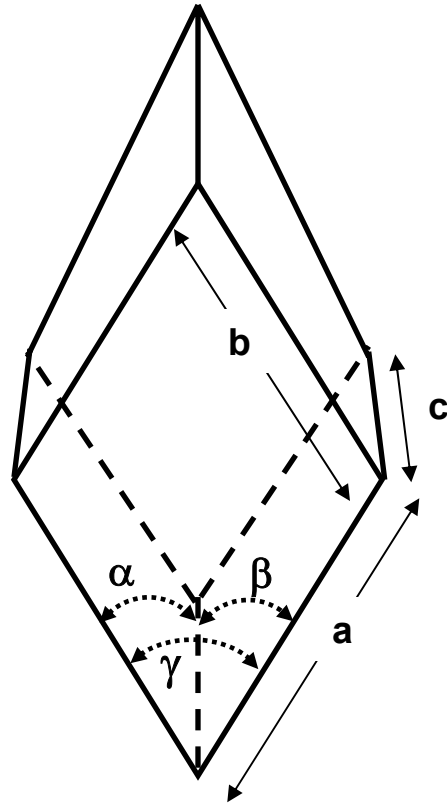
$$\begin{aligned} a &\neq b \neq c \\ \alpha &= \gamma = 90^\circ \\ \beta &\neq 90^\circ \end{aligned}$$

Triclinic (six sided)
(by shearing twice)



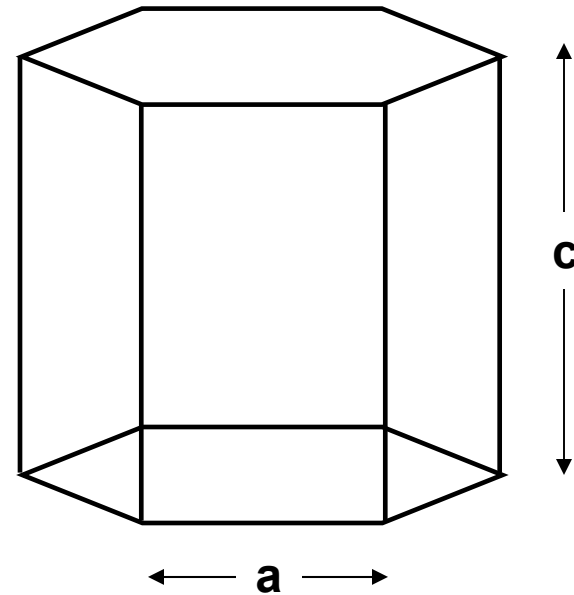
$$\begin{aligned} a &\neq b \neq c \\ \alpha &\neq \beta \neq \gamma \end{aligned}$$

Trigonal (or Rhombohedral)
(stretching along cube diagonal)

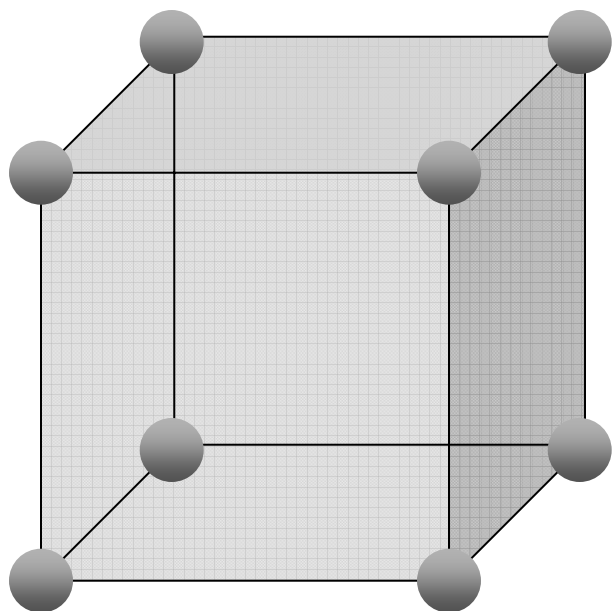


$$a = b = c$$
$$\alpha = \beta = \gamma < 90^\circ$$

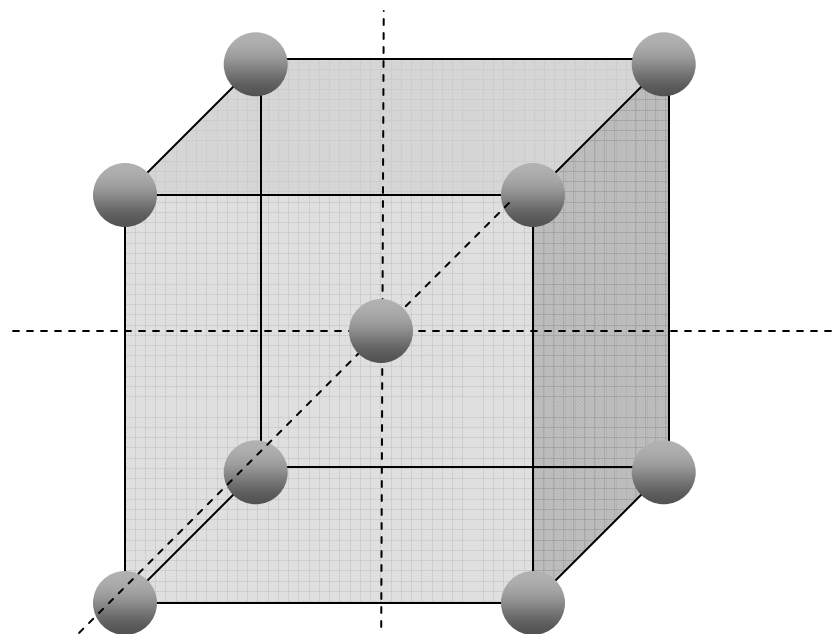
Hexagonal (8 sided)



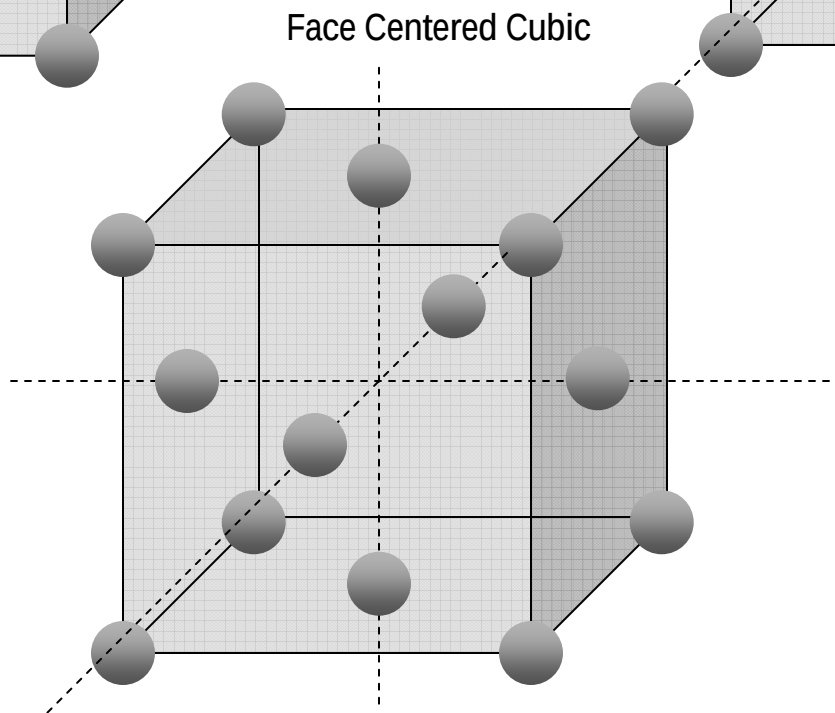
Cubic Crystal Class



Simple Cubic

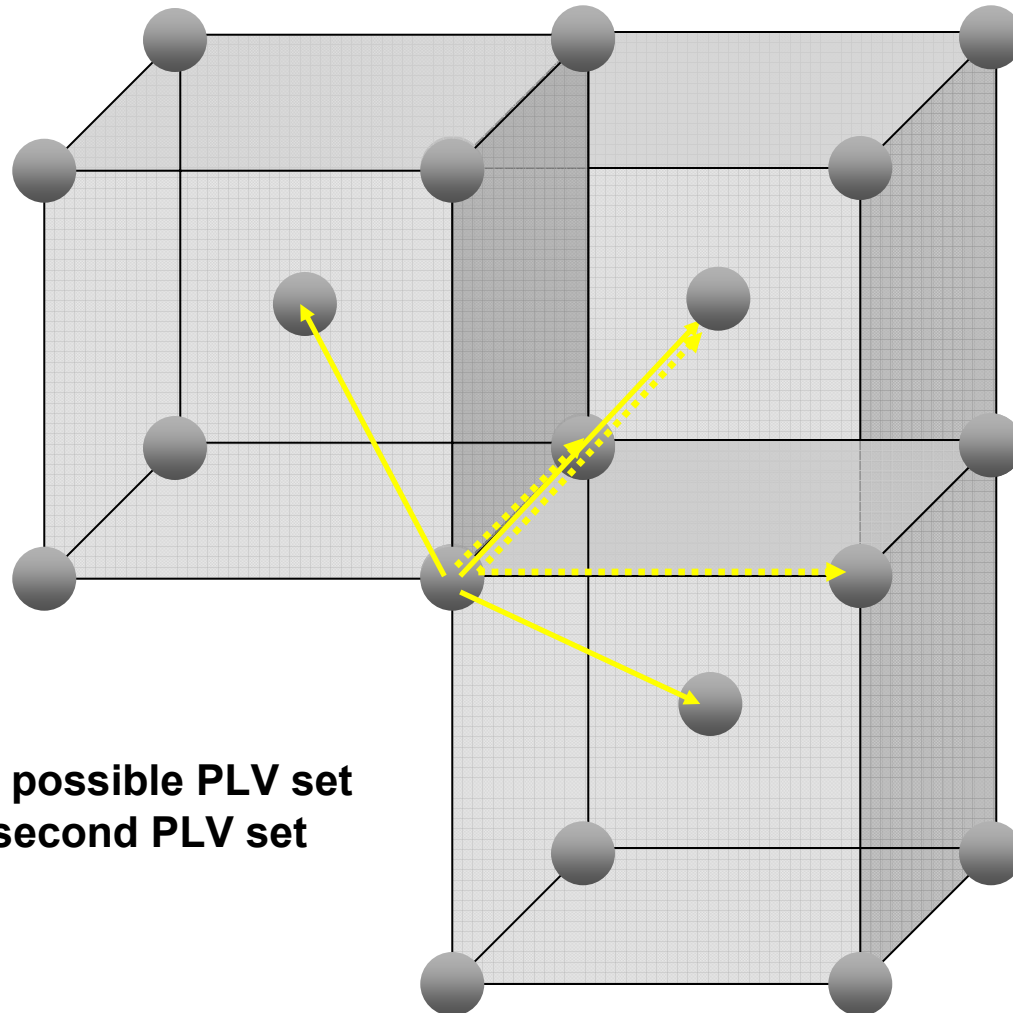


Body Centered Cubic



Face Centered Cubic

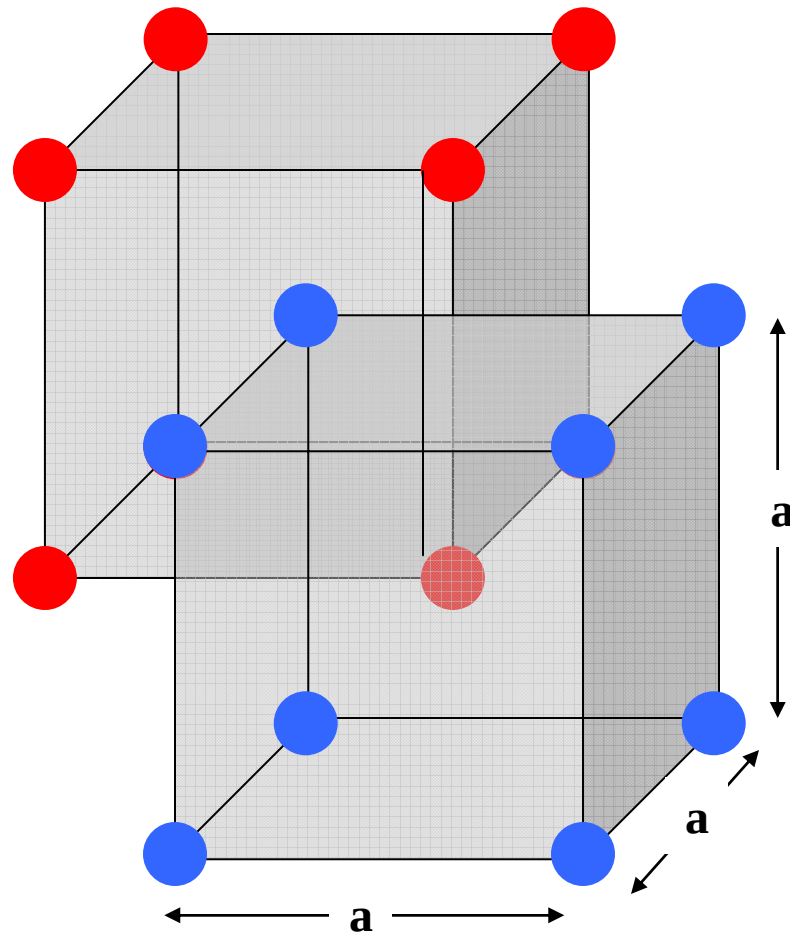
Two Possible Sets of Primitive Lattice Vectors for bcc Lattice
(there are many others too)



Solid arrows = one possible PLV set
Dotted arrows = a second PLV set

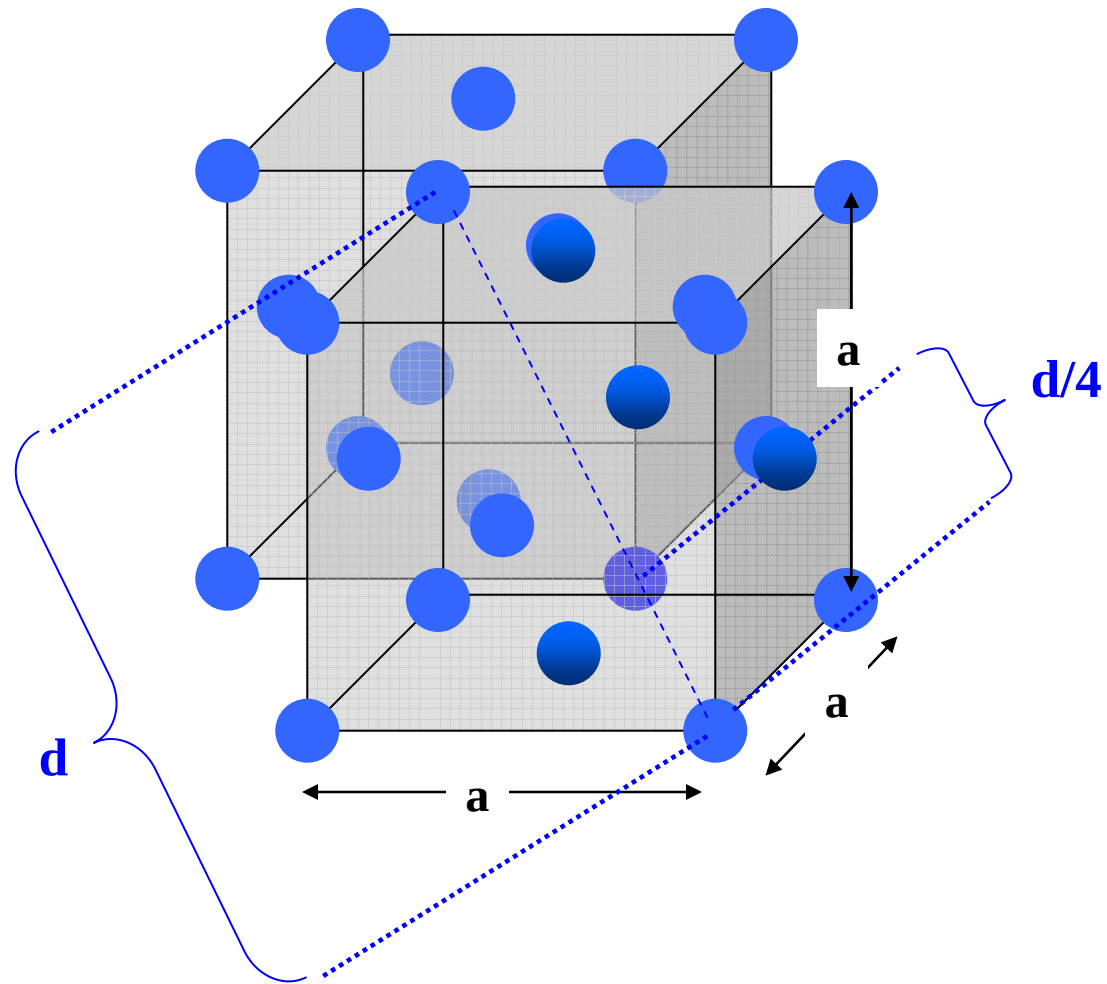
Lattice with a Basis (1)

CsCl Structure: Two interpenetrating sc lattices, each with different atom



Lattice with a Basis (2)

Diamond Structure: Two interpenetrating fcc lattices, each with same atom



Lattice with a Basis (3)

Zincblende: Two interpenetrating fcc lattices with different atoms on each

