Solid state - Primitive Lattice and Basis vectors - Reciprical Lattice and Diffraction

March 19, 2012

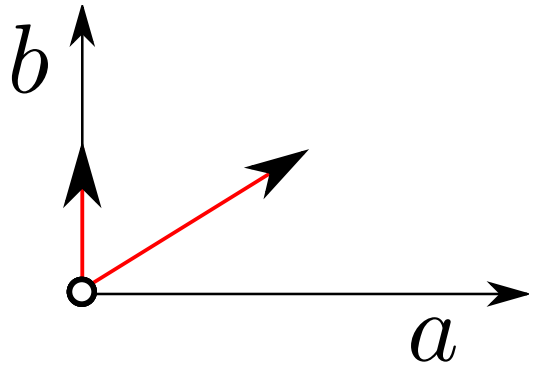
A 2-d lattice has the primitive lattice vectors:

$$\mathbf{A}_1 = a\hat{x} \text{ and } \mathbf{A}_2 = b\hat{y}$$

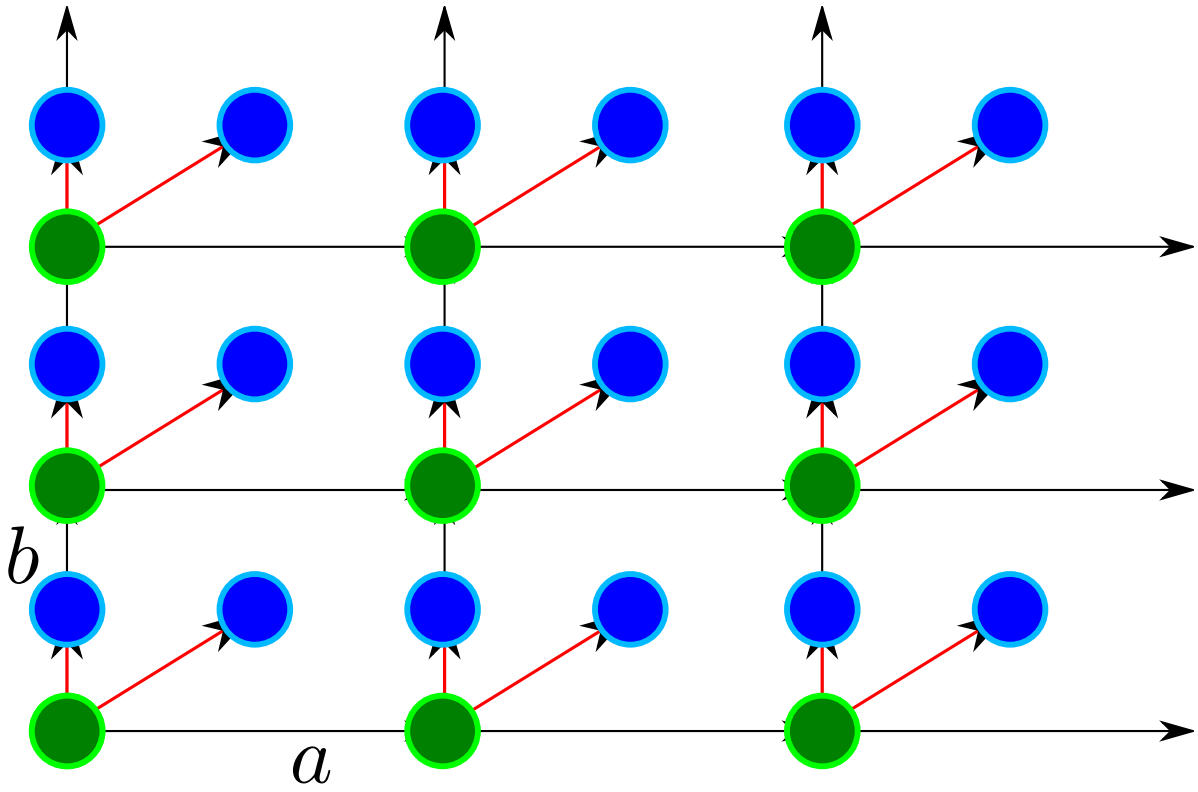
and the atomic basis vectors of

$$\mathbf{B}_1 = 0 \text{ , } \mathbf{B}_2 = \tfrac{b}{2}\hat{y}, \text{ and } \mathbf{B}_3 = \tfrac{a}{2}\hat{x} + \tfrac{b}{2}\hat{y}.$$

Draw the lattice. Draw the primitive lattice vectors black and the atomic basis vectors red.
Solution:



Then draw the crystal stucture repeated 3 times in both directions with atom $\mathbf{B}_1$ green and the other two blue.
Solution: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