

possible values of n_r and k .

for a particular value of n , the possible values of k are: $0, 1, 2, \dots, n$ while the corresponding values of n_r are $n, (n-1), (n-2), \dots, 0$.

But when $k=0$, b is $0 \rightarrow$ ellipse gets converted into straight line leading the moving electron to pass through the nucleus.

For $k=0$ is not acceptable

$$k = 1, 2, 3, \dots, n$$

$$n_r = (n-1), (n-2), (n-3), \dots, 0$$

We have $\frac{b}{a} = \frac{k}{(k+n_r)}$

When $n_r = 0$, b and a becomes the same.

Thus the ellipse gets reduced into a Bohr's circular orbit. Therefore, Bohr's circular orbit is only a special case in Sommerfeld's model.

From wave mechanics, the azimuthal q.n. is designated by l and l and k are related as

$$l = k - 1$$

Different Sommerfeld's orbit

