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Method of Equilibrium spinning

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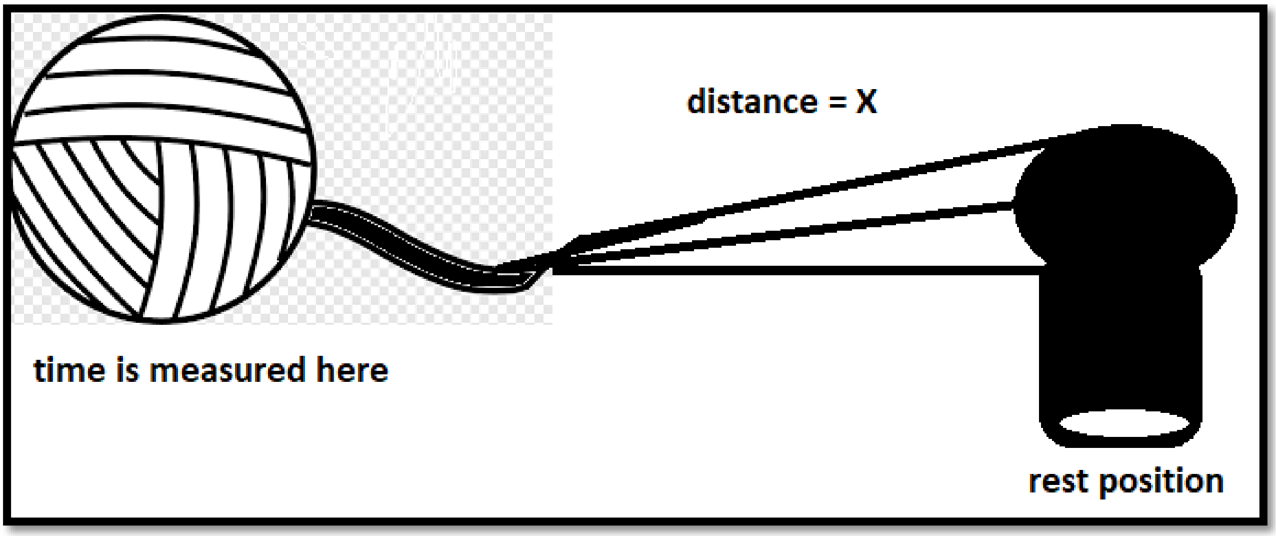
ABSTRACT: *The aim is to simulate the movement of time at rest position, and then study the relation between position of electron in H atom and its wavelength.*

KEYWORDS spinning time, wavelength.

I. INTRODUCTION



Spinning time: it is the time for each spinning and this spinning represents a small part of distance x.
To travel for a distance x, it needs a number of spinnings, N.

II. METHOD

To travel for a distance x, it requires a total time Δt, that represents N of spinning. So, the time for one spinning is period time, T, as follows:

$$T = \frac{\Delta t}{N}$$

so, the linear time is: $\Delta t = T.N$

Now, to find the distance x:

Length of the one spinning is a small part of the distance x.

$$x = \Delta t . v$$

$$v = \frac{\Delta x}{\Delta t}$$

And the length of one spinning is S, arc length;

$$S = 2\pi . r$$

Notice: r is increased with time while x is constant.

So, S is part of x every time.

$$S = \Delta\theta . r$$

Let the (r = x) as a condition boundary;

So, $r = \Delta t . v$

$\Rightarrow S = \Delta\theta . \Delta t . v$

$S = T . N . \Delta\theta . v$

$$T = \frac{S}{N . \Delta\theta . v} = \frac{r}{N . v}$$

$$T . v = \frac{r}{N}$$

$$v = \frac{r}{N . T}$$

(r/N) is a linear length depends on N.

So, we can say (r'=r/N) where r' is the length at a specific spinning.

$$r' = T . v$$

And $T = \frac{\Delta t}{N}$

And this is the total time at an N spinning.

$$\Longrightarrow \frac{r}{N} = \frac{\Delta t}{N} . v$$

$$r = \Delta t . v$$

$$r' = \frac{\Delta t}{N} . v$$

From kinetic energy law; $KE = \frac{1}{2} m\, v^2$

1. $KE = \frac{1}{2} m\, (\frac{r'N}{\Delta t})^2$
2. $KE = \frac{1}{2} m\, \left(\frac{r'}{T}\right)^2$
3. $KE = \frac{1}{2} m\, (\frac{r}{NT})^2$

By dividing (1) by (2):

$$1 = \frac{N^2}{\Delta t^2} T^2$$

By dividing (2) by (3):

$$1 = \frac{r'^2}{r^2} N^2$$

By comparison:

$$\frac{r'^2}{r^2} = \frac{T^2}{\Delta t^2}$$

So, $\sqrt{\Delta t^2} = \sqrt{\frac{r'^2}{r^2} T^2}$

And T/r =1/ v, so,

$$\Delta t = \frac{r}{v}$$

$$r = \Delta t \,.\, v$$

Suppose r is the total and r' is for every spinning.

$$r' = x - r$$

$$r = x - r'$$

And since; r'=r/N

$$\Longrightarrow (\frac{x}{N} - \frac{r}{N}) = \Delta t \,.\, v$$

$$x - r = \Delta t. v. N$$

$\Delta t. v = \frac{x - r}{N}$

$S = \Delta\theta. \Delta t\ .v \ \longrightarrow\ \Delta t. v = \frac{S}{\Delta\theta}$

By comparison:

$$\frac{x - r}{N} = \frac{S}{\Delta\theta}$$

The total distance:

$$x = \frac{S}{\Delta\theta}.N\ + r$$

And

$$S = 2\pi\ .r$$

$$\Longrightarrow x = 2\pi.\frac{N}{\Delta\theta}\ .r + r$$

$$x = \left(2\pi.\frac{N}{\Delta\theta}\ + 1\right) r$$

$$\Delta t. v = (2\pi.\frac{N}{\Delta\theta}\ + 1) r$$

And (v = $\frac{\lambda}{T}$),

$$\Delta t.\frac{\lambda}{T} = (2\pi.\frac{N}{\Delta\theta}\ + 1) r$$

Since; $\Delta t = T. N$

$$T. N.\frac{\lambda}{T} = (2\pi.\frac{N}{\Delta\theta}\ + 1) r$$

$$\boxed{\lambda = (\frac{2\pi}{\Delta\theta} + \frac{1}{N}) r}$$

III. RESULTS:

So, let's suppose N=1, and r is the radius of the first orbit in Hydrogen atom.

From previous work;

Now, we can find values of x_i and y_i from the following relations:

$x_i = \sqrt{\frac{r_i^2}{1+\tan^2(\theta_i)}}$ and $y_i = x_i \tan\ \theta_i$

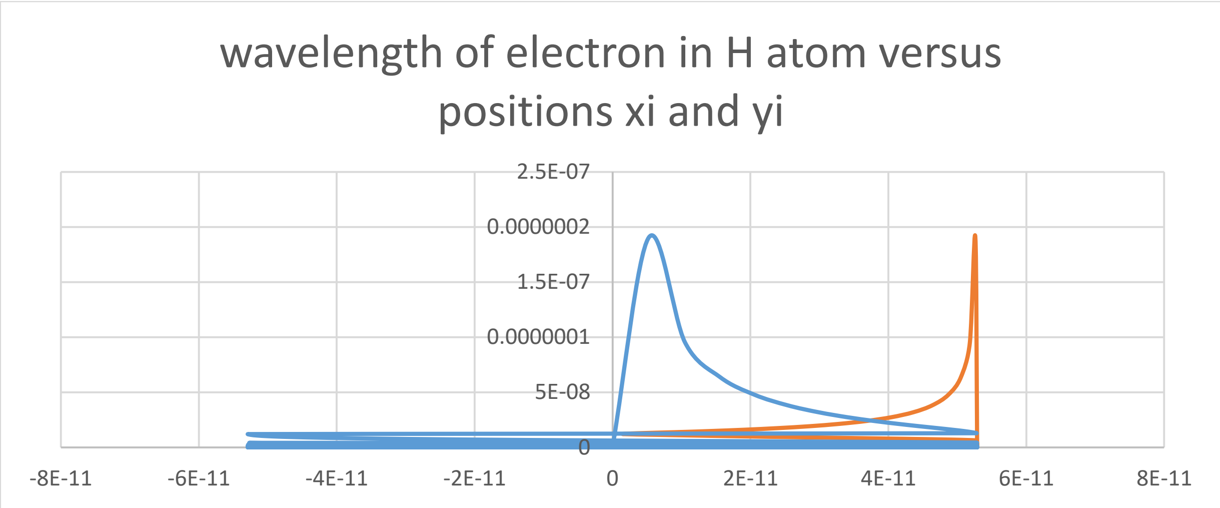
The radius of atom's orbit is from the following: $r_i = \frac{n^2 a_o}{Z}$

Where n is the orbit number and z is the atomic number of the atom. While $a_o = 0.0529 \times 10^{-9} nm$

Results:

When the angle θ_i is changing from 0 to 360 degrees and the $\Delta\theta = 0.1$ degree;

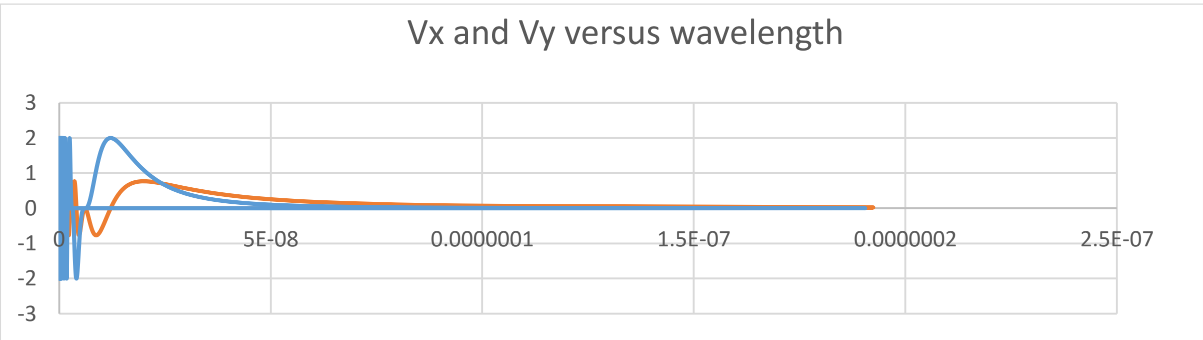
The following graph is the wavelength of electron in hydrogen atom against positions, xi and yi.

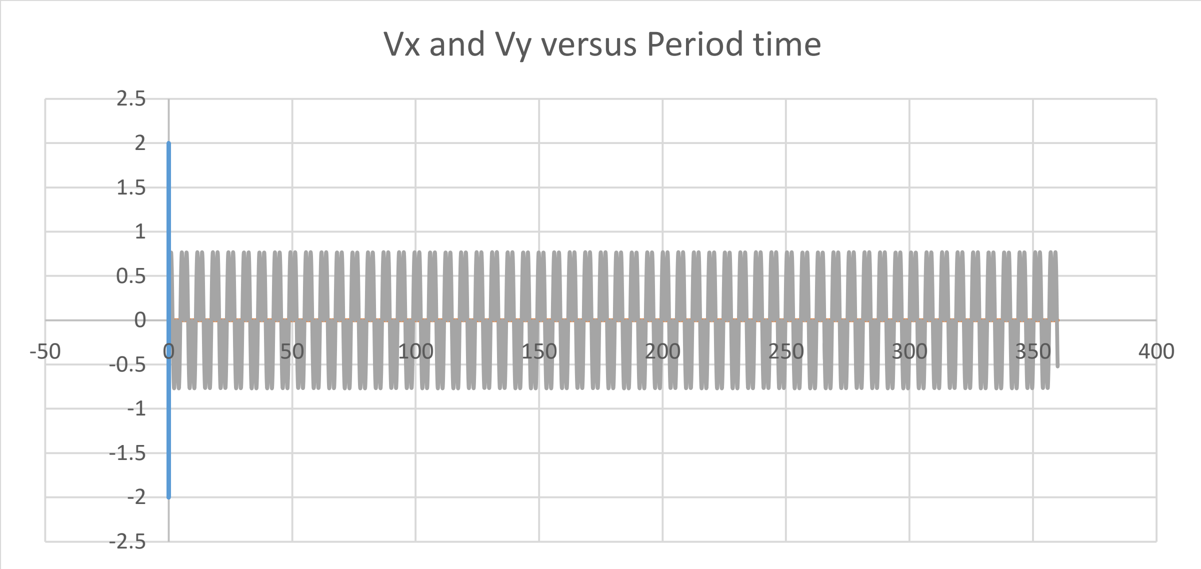


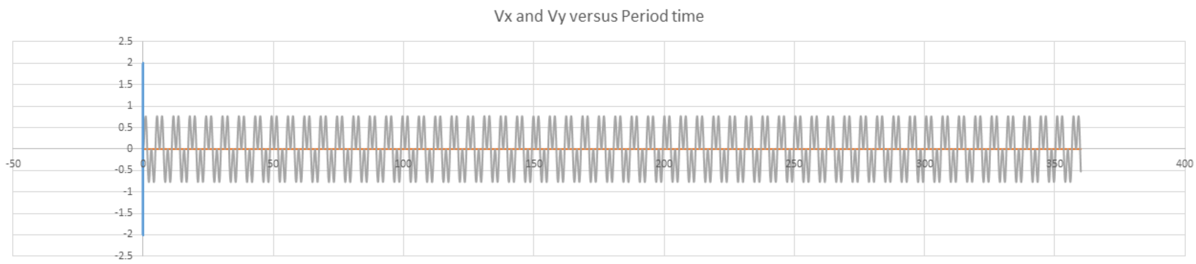
We apply the following equations:

$$\Delta t = \frac{\lambda}{v}$$

$$T = \lambda . \frac{\Delta t}{(\frac{2\pi}{\Delta\theta} + 1) r}$$







IV. CONCLUSION

The motion of electron around the nucleus is periodic.

We can notice there are 115 cycles, and for 360 degree we can find the value of pi,

360/115= 3.1304347826.