

$n_I = 1,$	$n_{II} = 2, 3, 4, \dots$	Lyman Series	Visible
$n_I = 2,$	$n_{II} = 3, 4, 5, \dots$	Balmer Series	Near IR
$n_I = 3,$	$n_{II} = 4, 5, 6, \dots$	Paschen Series	Far IR
$n_I = 4,$	$n_{II} = 5, 6, 7, \dots$	Brackett Series	Far IR
$n_I = 5,$	$n_{II} = 6, 7, 8, \dots$	Pfund	Far IR

Reduced Mass :  $\mu = \frac{mM}{m+M}$

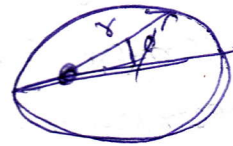
Limitations of Bohr's Model :

- ① Uni electron system / multi-electron system
- ② Hyperfine splitting
- ③ Contrary to Heisenberg's Uncertainty principle.
- ④ Zeeman effect and Stark effect.

Sommerfeld's relativistic atomic model

- ① The path of an electron around the nucleus, in general, is an ellipse. Circle is the one special case of ellipse.
- ② The velocity of the electron moving in an elliptical orbit varies considerably at different part of the orbit.

$$E_n = - \frac{2\pi^2 m e^4}{(n\pi + m)^2 h^2}$$



Concept of azimuthal quantum no.

$$b/a = k/n$$

$$\int p_{\phi} d\phi = n_{\phi} h$$

$$n = k + n_r$$

$$\int p_r dr = n_r h$$

$k = n$ , when the orbit is circular

$$l = (n-1)$$

$$m_{rel} = \sqrt{l(l+1)} \frac{h}{2\pi}$$