This expression shows that the total energy of the electron depends on k for a particular value of n. Thus for the H_α line in Balmer series ($n=3$ to $n=2$) there should be six lines.

quantum restriction, selection rule

$\Delta k = \pm 1$, Δn = any value.

[There are n different energy levels for a particular value of n]

This restriction when applied for the α-lines leads to three fine lines for Balmer Series.

Five lines in case of Paschen Series.

Lyman series should show no fine structure.

Penetrating power of the orbit:

Physicochemical property that for a particular n, the attractive force ~~from~~ the nucleus experienced by the electrons are in the order of

s > p > d > f

this can be explained with the help of Sommerfeld theory.

Quantum Defect:

Optical behavior of alkali metals are comparable to that of hydrogen or hydrogen like system.

$E_n = -RchZ^2/n^2$

Spectral studies found: $E_n = -\frac{RchZ^2}{(n^*)^2}$

n^* is found to be non-integral

The degree of departure follows the sequence

S-electron > p electron > d electron > f electron