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# Single Page Note

Energy orbital order	Unit 2 Atomic Structure	Electronic Configuration
	<b>Definition</b> The study of structure of atom is called atomic structure.	<b>Fundamental Particle</b> 1s 2s 2p 3s 3p 4s 3d 4p 5s 4d 5p 6s 4f 5d 6p 7s 5f 6d 7p
<b>n+l rule:</b> $s < p < d < f$ (l) $1 < 2 < 3 < 4$ (n)	Atoms made up of nearly 100 Particles!	Three are fundamental particles: neutron, proton, electron. Many other small particles: neutrino, antineutrino, positron, pions, muons.
2s (first) 3d (2nd).	<b>Cathode:</b> 1st discovered, negatively charged particle.	$V_1 = \frac{mv^2}{2}$ $V_2 = E_e - mg$ $He \rightarrow He^{+1} + e^{-}$ $Be^4 + He^4 \rightarrow C^{12} + n^1$
3d (first) 4p (2nd).	<b>Positive:</b> 2nd discovered, positive charged particle. <b>Neutron:</b> 3rd discovered, neutral particle.	
	<b>Electron mass ratio:</b> 1kg of electrons contain $1.7588 \times 10^{11}$ Coulombs of charge.	
Bohr's eqs: $v = me^4 \left[ \frac{1}{8Eh^3} \right] \left[ \frac{1}{n^2} - \frac{1}{n_1^2} \right]$	<b>Rutherford Experiment</b> Position of e <sup>-</sup> . Gave $\alpha$ experiment in which most of $\alpha$ particles path straight through gold foil.	<b>Bohr's Experiment</b> New atomic model. remove defects from Rutherford theory. Gave new theory.
<b>Values to remember</b>	<b>Zeeman Hydrogen spectrum</b> under magnetic field (ZM)	<b>Stark Hydrogen spectrum</b> under electric field (SE)
Proton charge: $+1.6022 \times 10^{-19} C$	<b>Spectrum</b> dispersion of light into VIBGYOR under prism.	<b>value:</b> $E_e = 8.854 \times 10^{-12} C^2 J^{-1} m^{-1}$ $\bar{n} = 3.142$ $h = 6.626 \times 10^{-34} J \cdot s$ $m = 9.11 \times 10^{-31} kg$ $e^- = 1.6022 \times 10^{-19} C$ $1J = 10^7 erg$
Electron charge: $-1.6022 \times 10^{-19} C$	<b>line</b> boundary between colors. isolated.	
Mass of Proton: $1.6727 \times 10^{-27} kg$	<b>Continuous</b> No boundary between colors, misolated.	
Mass of neutron: $1.6750 \times 10^{-27} kg$	<b>Hydrogen Spectrum Series</b> Give 5 series. Lyman = n1, Balmer n2, Paschen n3, Brackett n4, Pfund n5	
Mass of electron: $9.1095 \times 10^{-31} kg$	<b>Plank's Quantum Theory</b> Nature of light. h (constant Plank) = $6.626 \times 10^{-34} Js$	$E = nh\nu$ $E = hc/\lambda$
Mass amu: $1.0073$	<b>X-rays:</b> Produced by cathode ray & knocking of e <sup>-</sup> .	<b>Limiting line:</b> infinity diff b/w first & $\infty$ level is ionizing energy.
$e^- = 5.4858 \times 10^{-4}$	<b>Moseley law</b> $\sqrt{\nu} = a(z-b)$	
$n = 1.0087$	<b>Quantum No:</b> sets of numerical value, picture of atom.	
	<b>Principle (n) orbit no.</b> K, L, M, N. {1, 2, 3, 4}	<b>Azimuthal (l) orbital</b> s, p, d, f. $l = (n-1)$
	<b>Magnetic m (+l <math>\rightarrow</math> 0 <math>\rightarrow</math> -l)</b>	<b>Spin (s)</b> $+\frac{1}{2}, -\frac{1}{2}$ $\nu$ (1v) $+\frac{1}{2} = 0.5, -\frac{1}{2} = -0.5$