

Quantum Theory Based on experimental observations of *light and particles (electromagnetism)* Developed through rigorous mathematical computations Bridges physics and chemistry 6 Generally described as quantum

mechanics, aka quantum chemistry/

quantum physics

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57 La	Če	Pr	Nd	Pm	Sm	Eu Eu	Gd Gd	Tb	Dy Dy	e7 Ho	Er	Tm 59	70 Yb	Lu	72 Hf	73 Ta	74 W	75 Re	76 Os	77 r	78 Pt	79 Au	Hg	Ť	Pb	Bi	Po	At as	Rn	87 Fr	Ra
89 Ac	90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr	104 Rf	105 Db	106 Sg	107 Bh	108 Hs	109 Mt	110 Ds	111 Rg	112 Cn	113 Nh	114 Fl	115 Mc	116 Lv	117 Ts	118 Og	119	120
	f-block d-block p-block									50	lock																				





	Valence Elec	ctrons (A Group)
	The A Groups' outer s- bonding electrons; the s- and p- electrons, wh	and p- orbitals contain the A group number equals the total ich are the "valence electrons"
F	Atom	Valence Electrons
		2
		5
		7
	Inner electrons a	are called core electrons.



















	Par	tial Pari	Orbital Di	agram	ns and Electron Configur	rations* Condensed
Atomic Number	Element	(4 <i>s</i> , Sub	3d, and 4p levels Only)		Full Electron Configuration	Electron Configuration
		45	3 <i>d</i>	4p		
19	к	1			[1s ² 2s ² 2p ⁶ 3s ² 3p ⁶] 4s ¹	[Ar] 4s ¹
20	Ca	15			[1s ² 2s ² 2p ⁶ 3s ² 3p ⁶] 4s ²	[Ar] 4s ²
21	Sc	1J	1		[1s ² 2s ² 2p ⁶ 3s ² 3p ⁶] 4s ² 3d ¹	[Ar] 4s2 3d1
22	Ti	14	1 1		[1s ² 2s ² 2p ⁶ 3s ² 3p ⁶] 4s ² 3d ²	[Ar] 4s2 3d2
23	v	1J	1 1 1		[1s ² 2s ² 2p ⁶ 3s ² 3p ⁶]4s ² 3d ³	[Ar] 4s2 3d3
24	Cr	Ť	1 1 1 1 1		[1s ² 2s ² 2p ⁶ 3s ² 3p ⁶] 4s ¹ 3d ⁵	[Ar] 4s1 3d5
25	Mn	1J	1 1 1 1 1		[1s ² 2s ² 2p ⁶ 3s ² 3p ⁶] 4s ² 3d ⁵	[Ar] 4s2 3d5
26	Fe	1J	11 1 1 1 1		[1s ² 2s ² 2p ⁶ 3s ² 3p ⁶]4s ² 3d ⁶	[Ar] 4s ² 3d ⁶
27	Co	†↓	111111111		[1s ² 2s ² 2p ⁶ 3s ² 3p ⁶] 4s ² 3d ⁷	[Ar] 4s ² 3d ⁷
28	Ni	†∔	11111111		[1s ² 2s ² 2p ⁶ 3s ² 3p ⁶] 4s ² 3d ⁸	[Ar] 4s ² 3d ⁸
29	Cu	Ť	1111111111		[1s ² 2s ² 2p ⁶ 3s ² 3p ⁶] 4s ¹ 3d ¹⁰	[Ar] 4s1 3d10
30	Zn	†↓	111111111		[1s ² 2s ² 2p ⁶ 3s ² 3p ⁶] 4s ² 3d ¹⁰	[Ar] 4s23d10
31	Ga	†↓	111111111	Ť	[1s ² 2s ² 2p ⁶ 3s ² 3p ⁶] 4s ² 3d ¹⁰ 4p ¹	[Ar]4s ² 3d ¹⁰
32	Ge	†J.	11 11 11 11 11	1 1	[1s ² 2s ² 2p ⁶ 3s ² 3p ⁶] 4s ² 3d ¹⁰ 4p ²	[Ar]4s23d10
33	As	11	11 11 11 11 11	111	[1s ² 2s ² 2p ⁶ 3s ² 3p ⁶]4s ² 3d ¹⁰ 4p ³	[Ar]4s23d10
34	Se	14	11 11 11 11 11	11 1 1	[1s ² 2s ² 2p ⁶ 3s ² 3p ⁶]4s ² 3d ¹⁰ 4p ⁴	[Ar]4s23d10
35	Br	1J	11 11 11 11 11	1111	[1s ² 2s ² 2p ⁶ 3s ² 3p ⁶]4s ² 3d ¹⁰ 4p ⁵	[Ar]4s ² 3d ¹⁰
36	Kr	TH.	111111111111	11111	[1s ² 2s ² 2n ⁶ 3s ² 3n ⁶]4s ² 3d ¹⁰ 4n ⁶	[Ar]4s ² 3d ¹⁰







Quantum Chemistry Summary: Using the Periodic Table
 a 1. Group A valence electron configurations b 2. Individual electron configurations. Used to:
 a. Accurately predicting the physical properties and general chemical behavior of the elements.
 b. Accurately dentifying metals and nonmetals.
 c. Accurately predicting & formulas of compounds