|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Quantum Number | Range of Its Values | Relevance to Periodic Table | Relevance to Electrons in Atom | Importance in Chemistry |
| *n* | Integer values 1 to 7 | Correspond roughly to the period in the PT | The “shells”, the energy levels in the atom | Electrons with different n have different energies: when electrons go from ground state to excited state, these are transitions between different n levels |
| *l* | Integer values 0 to 3 | Account for the patterns seen in the groups of the Periodic Table: s-block, p-block, d-block, f-block | The “subshells”: there are intrashell energy differences that explain how orbitals are filled with electrons, but they are small compared to n-n transitions | Explains how electrons are filled within a shell (set by ***n***) and which give elements their special chemistry within these blocks (*s*, *p*, *d*, and *f*) |
| ml, ms | Do not struggle with these. These are more for chem major students | | | |

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| --- | --- | --- | --- | --- | --- |
| l value | Orbital type | # orbitals this type | Orbital geometric shape | Total # electrons in this type\* | Groups covered in Periodic Table |
| **0** | ***s*** | 1 | Spherical | 2 | 1-2 |
| **1** | ***p*** | 3 | Bilobed (“dumbbell” or peanut-shaped | 6 | 13-18 |
| **2** | ***d*** | 5 | Four bilobed “cloverleaf” and one bilobed with ring/torus | 10 | 3-12 |
| **3** | ***f*** | 7 | generally multi-lobed or cloverleaf-like, some with a doughnut-shaped ring. Are the most complex orbital shapes | 14 | Considered “inner transition” metal elements, not really covered by numbered Groups in table |
| \* total electrons = number of the orbital type (3rd column) times two electrons per orbital | | | | | |

