

Answer on Question#43509 – Physics – Atomic Physics

Question

List the possible subshells for the n = 6 shell.

Answer

The shell whose principal quantum number n = 6, includes the following subshells

Quantum numbers				Subshell	No. of orbitals in subshell
n	l	m_l	m_s		
6	0	0	+1/2 -1/2	6s	1
	1	-1, 0, +1	+1/2 -1/2	6p	3
	2	-2, -1, 0, 1, 2	+1/2 -1/2	6d	5
	3	-3, -2, -1, 0, 1, 2, 3	+1/2 -1/2	6f	7

So, the n = 6 shell includes three subshells, namely **6s**, **6p** and **6d**.

Subshell 6s involves 1 orbital, subshell 6p involves three orbitals (6p_x, 6p_y and 6p_z) and subshell 6d involves five orbitals (6d_{xy}, 6d_{xz}, 6d_{yz}, 6d_{x²-y²} and 6d_{z²}).

Though the 6f subshell is theoretically possible for n = 6 shell, atoms with such subshell do not exist.