SPIN QUANTUM NO. — In 1896 Zeeman observed that spectral lines in the atomic spectrum get split under the influence of a strong magnetic field. This phenomenon, called the Zeeman effect, is attributed to the orientation of the components of the angular momentum with respect to the external magnetic field and is given by $m\frac{h}{2\pi}$ where m = magnetic quantum number.

Later on it was observed in the atomic spectra of alkali metals that the spectral lines which were earlier considered to be single lines are actually narrow doublets (two lines quite close together). An explanation to these doublet lines was offered by Uhlenbeck and Goudsmit in 1925. They proposed that the electron is also associated with rotation about its own axis (spining). Axial spin of the electron is associated with spin

angular momentum whose magnitude is given by $m_s \frac{h}{2\pi}$, m_s is called spin quantum number. The spin quantum ~~no~~ can have values $+\frac{1}{2}$ or $-\frac{1}{2}$ which arise from the direction of spin (clockwise or anticlockwise) It is also designated as ↑ or ↓. Thus the description of an electron in an atom in terms of three quantum numbers is not complete and, in fact, four quantum numbers n, l, m, m_s are needed to describe the electron in an atom completely.

An electron is a spinning negative charge and a spinning charge is magnetic; therefore, a spinning electron can be considered to behave like a tiny magnet. Two electrons with opposite spins in an orbital will behave as two tiny magnets with opposite poles towards each other and thus attract each other.

n	l	m	m_s
1	0	0	$+\frac{1}{2}$
			$-\frac{1}{2}$