

Electron Spin or Spin Quantum Number is the fourth quantum number for electrons in atoms and molecules. Denoted as m_s , the electron spin is constituted by either upward ($m_s = +1/2$) or downward ($m_s = -1/2$) arrows.

Introduction

In 1920, Otto Stern and Walter Gerlach designed an experiment, which unintentionally led to the discovery that electrons have their own individual, continuous spin even as they move along their orbital of an atom. Today, this electron spin is indicated by the fourth quantum number, also known as the **Electron Spin Quantum Number** and denoted by m_s . In 1925, Samuel Goudsmit and George Uhlenbeck made the claim that features of the hydrogen spectrum that were unexamined might be explained by assuming electrons act as if it has a spin. This spin can be denoted by an arrow pointing up, which is $+1/2$, or an arrow pointing down, which is $-1/2$.

What is Electron Spin?

The electron spin is one of the three inherent properties of the electrons; the others are mass and charge of the electron. The electron spin is described as the spinning of the electron around its axis.

 is articulated as: $\|S\| = \sqrt{s(s+1)}h$

 where,

- s is equivalent to a quantized spin vector
- The spin vector is articulated as $\|s\|$
- The spin quantum number (s) is associated with the spin angular momentum and h is the Plancks constant.

The spin quantum number can be articulated as: $S = \frac{n}{2}$

Any non-negative integer can be n .
The permitted values of the spins are 0, 1/2, 1, 3/2, 2, etc.

The intrinsic angular momentum of Electron is signified by quantum number 1/2

The total **angular momentum s** is articulated by:

