

Spin & the Exclusion Principle

Physics

The quantum number with no classical analogue, and its consequence.

Fermions

- Half-integer spin ($\frac{1}{2}$, $\frac{3}{2}$)
- Obey the Pauli exclusion principle
- Electrons, protons, neutrons, quarks
- Antisymmetric wavefunction
- Make up matter

Bosons

- Integer spin (0, 1, 2)
- Can share a state without limit
- Photons, gluons, Higgs
- Symmetric wavefunction
- Carry forces

THE DIFFERENCE THAT MATTERS

Exclusion is why the periodic table has structure and why solid objects resist compression.

Bose-Einstein condensates form when many bosons occupy the same ground state at near absolute zero.