Answer on Question #48069-Physics-Atomic Physics

Why the spin of electron is half?

Answer

Experimental evidence like the hydrogen fine structure and the Stern-Gerlach experiment suggest that an electron has an intrinsic angular momentum, independent of its orbital angular momentum. These experiments suggest just two possible states for this angular momentum, and following the pattern of quantized angular momentum, this requires an angular momentum quantum number of $\frac{1}{2}$.

With this evidence, we say that the electron has spin $\frac{1}{2}$. An angular momentum and a magnetic moment could indeed arise from a spinning sphere of charge, but this classical picture cannot fit the size or quantized nature of the electron spin. The property called electron spin must be considered to be a quantum concept without detailed classical analogy.