Spin magnetic moment

Main article: magnetic moment

In physics, mainly quantum mechanics and particle physics, a **spin magnetic moment** is the magnetic moment caused by the spin of elementary particles. For example, the electron is an elementary spin-1/2 fermion. Quantum electrodynamics gives the most accurate prediction of the anomalous magnetic moment of the electron.

In general, a magnetic moment can be defined in terms of an electric current and the area enclosed by the current loop. Since angular momentum corresponds to rotational motion, the magnetic moment can be related to the orbital angular momentum of the charge carriers in the constituting current. However, in magnetic materials, the atomic and molecular dipoles have magnetic moments not just because of their quantized orbital angular momentum, but also due to the spin of elementary particles constituting them.[a][b]

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"Spin" is a non-classical property of elementary particles, since classically the "spin angular momentum" of a material object is really just the total *orbital* angular momenta of the object's constituents about the rotation axis. Elementary particles are conceived as point objects which have no axis to "spin" around (see wave–particle duality).