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On the concept of spin in electrodynamics

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Abstract: It is substantiated that spin is a notion associated with the group of internal symmetry that is tightly connected with the geometrical structure of spacetime. The wave equation for the description of a particle with spin one half is proposed. On this ground it is shown that the spin of electron is exhibited through the quantum number and accordingly the Dirac equation describes properties of particles with the projection of spin \pm \hbar/2. On the contrary, we put forward the conjecture that the spin of the quark cannot be considered as a quantum number, but only as an origin of a non-abelian gauge field. The reason is that the quark and electron from physical, geometrical and group-theoretical points of view differ from each other. It is from such deep reason understanding quark-lepton symmetry and such important phenomena as quark confinement is important.

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