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The quantum hall effect and the theory of supraconductivity

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The quantum hall effect is certainly one of the most remarkable discoveries of the end of the XX century in physics. Its most spectacular caracteristics is the measurement of the universal ratio constants $h/e^2$with an accuracy of 10^{-9}, which has immediate consequences in metrology, particularly in defining the standard resistance. The quantum Hall effect actually consists of two different physical effects ,the plan of this paper is the following

Firstly, we became interested in quantum mechanics of two-dimensional electrons in a magnetic field using the polar coordinate system (particles in a uniform magnetic field), results were obtained regarding the definition of orbital angular momentum of a particle and its projection and statistics related to this type of particle.

Secondly ,we study the fractional quantum Hall effect from the notion of the electron pair of the theory of superconductivity proposed by the authors BCS, we determine the exact wave function for the fundamental theory, the wave function of the electron pair is simply the wave function of 'Laughlin' but two electrons to a multiplicative hypergeometric function near .the merit of this work is not only to have to calculate the wave function, but showed that the energy of this state is lower than the Wigner crystal, recall that the crystal has been proposed as a ground state because its correlation is favorable to the minimization of the Coulomb repulsion.

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