Grenoble and Graphene:
The path to success of the quantum Hall effect

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Abstract

Graphene plays an important role in the field of quantum Hall science due to its special band structure, its almost ideal two-dimensional character and its high charge carrier mobility. The talk will present an historical review about the physics and application of the quantum Hall effect since this quantum phenomenon was discovered in 1980 at the High Magnetic Field Laboratory in Grenoble. It was clear from the very beginning, that the quantization of the Hall resistance in subunits of h/e^2 is very important in metrology- the science of measurements. However, nobody expected that this discovery would be important for the realization of a new kilogram and for the worldwide introduction of a new "International System of Units" based on constants of nature. The presentation summarizes recent developments and the contributions of graphene in this field.