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Im Rahmen der

AG Komplexe Analysis

laden wir zu folgendem Vortrag ein:

Modelling of the (integer) quantum Hall effect and the Hofstadter butterfly

(Nicolai Rothe, Bergische Universität Wuppertal)

am **Dienstag, den 22.06.2021, um 16:30 Uhr s.t. online (Zoom-Link siehe Email).**

Abstract: After a short introduction on the experimental setup for the classical Hall effect and the Quantum Hall effect (QHE), I will present an overview of the mathematical modelling of crystals, the Bloch theorem and the Bloch-Floquet transformation in the so-called tight-binding approximation. The latter transformation allows to decompose the underlying Hilbert space into a sum of section spaces in a corresponding family of complex line bundles. In the end, it's the Chern numbers of these bundles, well known to be integers, which determine the quantized Hall conductivity of a probe. Hence, a graphical representation of of these Chern numbers in dependency of the external magnetic field, called the Hofstadter butterfly, may be viewed as a phase diagram for the QHE. If the time allows, I will head to some properties of that phase diagram, e.g. its self similarity, which I had worked on in the context of my master thesis.

Alle Interessenten sind herzlich eingeladen!

gez. Prof. N. Shcherbina