

# Seminar on Condensed Matter Theory

Group of Theoretical Physics at the Department of Condensed Matter Physics of Charles University has a pleasure to invite you to attend the seminar

**on 13 December 2018 at 14:00**

at Faculty of Mathematics and Physics of Charles University, Ke Karlovu 5, 121 16 Praha 2

**Lecture Hall F2**



## Prof. Dr. Klaus Morawetz

*Muenster University of Applied Sciences Department Physical Engineering, Steinfurt, Germany*

## Anomalous transport in Weyl systems and graphene normally explained

joined with Nanoseminar (note different time and place)

The anomalous term in the balance of the chiral density can be rewritten as quantum current and does not violate classical conservation laws as it is claimed to be caused by quantum fluctuations. Moreover this term is derived from the quantum kinetic equations for systems with SU(2) structure within a completely conserving approach. Therefore the origin of this term is not a unique signal of symmetry-breaking terms in the field theoretical Lagrangian. Regularization-free density and pseudospin currents are calculated in Graphene and Weyl-systems realized as the infinite-mass limit of electrons with quadratic dispersion and a proper spin-orbit coupling. The intraband and interband conductivities are discussed and the optical conductivity agrees well with the experimental values using screened impurity scattering and an effective Zeeman field. The universal value of Hall conductivity is shown to be modified due to the Zeeman field.

