

# 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 18 April 2019 at 13:00**

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

**Seminar room F052**



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## Theoretical calculation of linear terahertz conductivity of nanocrystals

working version

Typical scattering times in high-quality semiconducting materials are in the interval from several tens of femtoseconds up to one picosecond, comparable to the oscillation period of terahertz radiation. This relation implies difficulties in the theoretical evaluation of the electronic response to external THz fields since neither of the times (scattering time or field period) can be regarded as a major driving term in the dynamics with respect to the other one. For bulk materials, models based on the solution of the quantum Boltzmann equation exist and give reliable predictions. For nanocrystals, on the other hand, the existence of the crystal surface causes unavoidable difficulties and the impossibility of the application of the standard theoretical approaches. In my talk, I will give a brief overview of existing theories and their results, I will review the typical experimental results and finally I will present a quantum model which is capable of description of the typical behavior of the linear electronic response to THz fields. Employing some assumptions on the parameters of the model, the quantum model can be further simplified to retrieve all classical formulas which appeared previously in the literature.

