

**Wednesday 27<sup>th</sup> of February 2019, 16:00**

*Campus Schenefeld, main building (XHQ) room E2.042*

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## **Floquet Analysis of Excitations in Solids**

I will discuss how the non-equilibrium electronic structure of pump-probe experiments can be viewed in terms of Floquet theory. The periodic nature of an optical excitation allows to decompose the solutions of the time-dependent Schrödinger equation in terms of quasistatic dressed states of electron-photon quasiparticles. Using results from time-dependent density functional theory, I will show how the spectrum of these quasiparticles determines the spectral function in pump-probe photo-emission spectroscopy. The non-equilibrium Floquet electronic structure can have different topological properties leading to the concept of Floquet engineering of materials properties. While for optical pumping the time periodicity of the system is delivered by an external perturbation, the Floquet concept can be equally applied to internal modes of a solid, such as phonons, leading to electron-phonon dressed states, that are characterised by the inherent electron-phonon coupling of the material. I will finally briefly describe how the Floquet concept leads to a general first principles numerical approach to treat electron-boson coupling solids.

[1] H. Hübener, U. De Giovannini and A. Rubio, *Nano Lett.*, 1535 18, 2018

[2] U. De Giovannini, H. Hübener and A. Rubio, *Nano Lett.*, 7993 16, 2016

[3] U. De Giovannini, H. Hübener and A. Rubio, *JCTC* 265 13, 2017

Host: Evgeny Gorelov