



Datum: 08.01.2020

IFMP Seminar

When: **21 January 2020, 14:50 h**

Where: **REC / C 213 H**

Speaker: **Dr. Aliaksei Charnukha**

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Title: **Local and non-local spectroscopy of quantum matter**

Abstract:

A decade after the discovery of high-temperature superconductivity in iron-based compounds our understanding of their properties has reached the level of maturity comparable with other families of unconventional superconductors. Various kinds of spectroscopy (optical, electron, neutron) have shed essential light onto the microscopic underpinnings of the complex phenomenology of these materials. With the help of the aforementioned techniques, several fundamental aspects of the low-energy physics of iron-based superconductors have now been established with near certainty. These aspects include strong interband coupling of quasiparticles, highly momentum-dependent nature of the superconducting energy gap, nematic electronic order, and the key role played by Lifshitz transitions and incipient bands. Furthermore, and similarly to many other quantum materials, iron-based compounds have been found conducive to interfacial engineering. Novel interfacial phases hold great promise due to their strongly confined character but are challenging to access using conventional local ($q \approx 0$) probes. A recent addition of a nano-resolved capability to conventional optical spectroscopy is poised to usher in a new age of investigation and control of non-local collective phenomena and confined phases in quantum matter. This talk will overview some of the salient advances achieved with the help of optical and electron spectroscopy in the field of iron-based superconductivity as well as outline the current state-of-the-art and the future promise of non-local optical spectroscopy.

Invited by Prof. Jochen Geck