



EINLADUNG zum IFP-SEMINAR

Current Topics on Mott-Semimetal Ruthenates

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Host: Silke Bühler-Paschen
Termin: **Freitag, 29 September 2017, 11:00 Uhr**
Ort: Institut für Festkörperphysik, TU Wien
Wiedner Hauptstraße 8-10, 1040 Wien
Seminarraum DC rot 07 (roter Bereich, 7. OG)
Förderer: FWF I2535-N27 „TopQuantum“

The Mott insulator is considered as an electron “solid” frozen due to strong electron correlations. It has thus a potential to become a good metal or to exhibit other novel states of matter if the electron solid melts by suitable stimuli. In this talk, we show that DC current can be a powerful tuning parameter to induce novel states of highly correlated electron systems in the vicinity of the Mott transition.

We will first describe novel phenomena we found in the layered ruthenium oxide Ca_2RuO_4 , for which steady non-equilibrium conditions introduced by DC electric field and current not only trigger but also maintain the charge “liquid” state down to low temperatures [1].

When the electric current is not very strong, the Mott-gap can be tuned to disappear gradually. In such a condition, Ca_2RuO_4 exhibits a semi-metallic conduction and giant diamagnetism [2]. We will discuss how the partial Mott-gap closing leads to such diamagnetic behaviour and the term “Mott semimetal” is appropriate to describe such a state.

Finally, we will present on another ruthenate system which exhibit a very similar changeover to a semimetal state with diamagnetism under DC current.

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References

[1] F. Nakamura et al., Sci. Rep. 3, 2536 (2013).

[2] C. Sow et al., arXiv:1610.02222 (2016).

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