



# TRR 80 Sonderseminar

Am Montag, den 24. April um 17:30 Uhr

spricht

***Prof. Dr. Christoph Strunk***

**Universität Regensburg**

über das Thema

***The superconductor/insulator transition in thin films  
and wires***

Recent experiments on strongly disordered superconducting TiN films and wires near the localization threshold are presented. If scaling and the extraction of a critical exponent is possible, a crossing (or isosbestic) point of the magnetoresistance isotherms is commonly taken as a hallmark of a magnetic field-induced superconductor/insulator transition - a prime example of a quantum phase transition. In our films we observe up to three such isosbestic points in the same film at different temperature intervals. By gradual oxidation of the film in air, we can trace all these isosbestic points upon the approach of the localization threshold. It turns out that only one of them (at intermediate temperatures) is a plausible candidate for a quantum phase transition, which is expected to take place at an universal critical resistance of  $4e^2/h$ . The others also allow for scaling, but the corresponding critical resistance and the exponent vary continuously with the degree of disorder, as opposed to the expected universal behavior.

In a second part of the presentation I will discuss the properties of TiN nanowires, which display a very similar similar phenomenology for wire widths down to a few 100 nm. For the narrowest wires at zero magnetic field, the IV-characteristics strongly resemble those of small Josephson junctions, described by the Ivanchenko-Zilberman model. In the field range between 0.6 and 3 Tesla, the behavior is strongly insulating, and can be described in terms of a dual Ivanchenko-Zilberman model. This reflects the charge/phase duality well known from small Josephson junctions, and indicates that the TiN wires can be viewed as small random Josephson networks.

Gäste sind herzlich willkommen.

Der Vortrag findet im Seminarraum T-1004, Institut für Physik,  
Universität Augsburg statt.

Gastgeber: Prof. Dr. Ulrich Eckern  
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