

Physikalisches Kolloquium

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»From Insulator to Superinsulator –

the Charge Berezinskii-Kosterlitz-Thouless transition in insulating TiN films«

Einführung: W. Wulfhekel

Recently a transition from an insulating state with a sheet resistance $\sim 1 \text{ M}\Omega$ to a much more strongly insulating state with an unmeasurably small linear conductance was observed in strongly disordered TiN thin films [1]. It was suggested that this transition may be interpreted as the charge analog of the familiar vortex Berezinskii-Kosterlitz-Thouless (BKT) transition, resulting from a granularity within the electronic system [2]. We present new data on the linear and non-linear conductance of such films, which allow a separation of competing heating instabilities in the strongly insulating state from the non-linearities typical for the BKT transition. At very low temperatures, we observe power laws $I \sim V^\alpha$ in the dc IV-characteristics with a strongly temperature dependent exponent α , which is a hallmark of the BKT transition.

[1] T. Baturina et al., PRL 99, 257003 (2007).

[2] V. Vinokur et al. Nature 452, 613 (2008).

Freitag, 21.05.2010, 17 Uhr c.t.,

KIT, Campus Süd,

Otto-Lehmann-Hörsaal, Physik-Flachbau (Geb. 30.22).

Anschließend Nachsitzung im Gastdozentenhaus „Heinrich Hertz“