



TRR 80 Seminar

Am Dienstag, den 19. Oktober um 16:00 Uhr

spricht

Prof. Dr. Dirk van der Marel

DPMC, Universität Genf

über das Thema

Optical spectral weight and the fate of the charge carrier mass upon approaching a metal-insulator transition

In many materials it is possible to tune their parameters such as to invoke a transition between a metallic and an insulating phase. In transition metal oxides, such as SrTiO_3 or cuprate high temperature cuprates this is usually achieved by doping electrons or holes into the insulating parent compound. In pure bismuth or bismuth-antimony alloys a different kind of doping can be obtained, whereby one simultaneously reduces electron and hole density to zero by tuning the lattice parameter, either using mechanical or chemical pressure. In all cases the approach to the metal-insulator transition from the metallic side implies that the ratio n/m^* has to vanish at the point where the material becomes insulating, where n represents the density of the charge carriers and m^* their effective mass. Experimentally the quantity n/m^* represents the spectral weight in the zero-frequency mode which can be studied using optical spectroscopy. An important question is then, what happens to n and m^* individually as one approaches the metal-insulator transition. In this seminar I will demonstrate, using optical spectroscopy as a tool, that the answer to this question depends on the type of insulator which is formed, and strongly different behaviour is observed for m^* depending on whether the insulator is a semi-metal, a band-insulator or a Mott-Hubbard insulator.

Gäste sind herzlich willkommen!

Der Vortrag findet im Seminarraum 288/Physik-Süd, Universität Augsburg statt.

Gastgeber: Dr. Joachim Deisenhofer

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