



EINLADUNG zum IFP-SEMINAR

Thema: **Quantum transport simulations in presence of electron-phonon interactions**

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Host: Karsten Held

Termin: **Montag, 9 Dezember 2013, 11 Uhr**

Ort: Institut für Festkörperphysik, TU Wien
Wiedner Hauptstraße 8-10, 1040 Wien
Seminarraum 138C, 9. OG (gelbe Leitfarbe)

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Device simulation has attracted large interest since the dimensions of electronic devices reached the nanoscale. Among the new physical phenomena observed we focus on interaction-induced effects. Particular emphasis is placed on electron-phonon interactions as it is one of the most important carrier mobility-limiting mechanisms in nanodevices.

Using the k,p multiband theory combined with the Non-Equilibrium Green's Function formalism, we model 3 types of double-gate devices: p-type MOSFETs, junctionless p-type MOSFETs and Tunnel FETs (TFETs).

The 2D architecture of the double-gate device enables us to investigate the influence of confinement in one direction, infinite propagation in the other direction and connection to semi-infinite reservoirs in the last one.

Different crystallographic orientations, channel materials, gate lengths and channel widths are investigated.

From a fundamental point of view, phonon scattering is usually implemented via the so-called Self-Consistent Born Approximation (SCBA). We explore the validity of a one shot current conserving method based on the Lowest Order Approximation (LOA). A comparison between SCBA, LOA and its analytic continuation (LOA+AC) in multiband models is discussed.

