TECHNISCHE UNIVERSITÄT DRESDEN

Faculty of Physics

PHYSICS COLLOQUIUM

Speaker:

Prof. Jürgen König
Fakultät für Physik,
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Duisburg,
Germany

Topic:

Charge-Carrier Dynamics in Nanostructures: What can we learn from Real-Time Measurement of Electron Tunneling in Quantum Dots?

Time and place:

Tuesday, November 21, 2023, **2:50 pm** – hybrid event
The colloquium will be held in REC/C213.
Online participation possible:
Zoom-Meeting: Meeting-ID: 631 3817 8900 / passcode: PC-WiSe23
https://tu-dresden.zoom-x.de/j/63138178900?pwd=am9nSzYyeUh3SWxMdnNBWkpUaXl5UT09

Host:

Prof. Matthias Vojta

Abstract:

Time-resolved studies of quantum systems are the key to understanding quantum dynamics at its core. The real-time measurement of individual quantum numbers as they switch between certain discrete values, well known as a "random telegraph signal," is expected to yield maximal physical insight. An example is electron tunneling in quantum dots, for which recent progress in nanotechnology has made it possible to monitor individual tunneling events in real time. This raises the question of how to extract from the measured time traces useful information about the underlying quantum dynamics. I will demonstrate the usefulness of so-called factorial cumulants as a tool to access in recently measured data phenomena such as spin relaxation, Auger and spin-flip Raman processes as well as stochastic resonance in quantum dots or magnetic switching in spin-cross over complexes. This includes a discussion of the error resilience of factorial cumulants, which makes them superior to ordinary ones usually employed in the literature.

Bio:

Prof. Dr. Jürgen König studied physics in Karlsruhe. He received the Diplom in 1995 and got his Ph.D. in 1998 under the supervision of Prof. Dr. Gerd Schön. From 1999 to 2001, he was a postdoc with Prof. Dr. Allan H. MacDonald, first at Indiana University of Bloomington and then at the University of Texas at Austin (both USA). After his return to Karlsruhe, Jürgen König was the Leader of an Emmy-Noether Junior Research Group, before he became Associate Professor (C3) at the Ruhr-University of Bochum in 2003. Since 2008, he is Full Professor (W3) at the University of Duisburg-Essen.