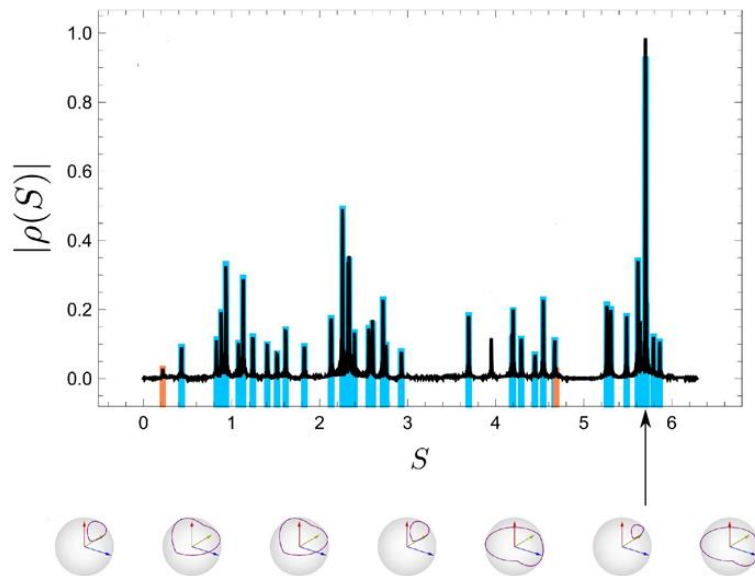


New Directions in Mesoscopics and Quantum Chaos

Dr. Daniel Waltner
Universität Duisburg-Essen



I start with an introduction to quantum chaos and its relation to mesoscopic physics. Whereas previous research in quantum chaos focussed mainly on single-particle effects I present here an extension of quantum chaos to an interacting many-particle system by using new semiclassical concepts. I show in this context how classically collective dynamics can dominate the quantum spectrum. This analysis is performed for a spin chain, systems of this kind are currently in the focus of theoretical and experimental research. In the last part of the talk I discuss quantum pumping, a pile-up of charge created by a moving barrier and not by an applied bias.

In contrast to previous research concentrating on adiabatic or periodic motion of the barrier I focus on pumped charges induced by random non-adiabatic barrier motion.