

Sommerfeld Theory Colloquium

Wednesday, 1th June 2005

at 11.15 h

room 349, Theresienstr. 37 / III

Prof. Boris Altshuler
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Mesoscopic physics: from Brownian motion to quantum devices.

One of the revolutionary papers that Einstein wrote in 1905 is devoted to the theory of the Brownian motion - motion of particles that are small enough to feel the molecular motion, and large enough to be observed individually. Einstein proposed statistical analysis of the motion of each Brownian particle and derived Diffusion equation to perform this analysis. This idea of statistical approach is so crucial for modern mesoscopic physics, that it would be a fare to start the history of the field from the celebrated Einstein's paper. Mesoscopic (sample-specific) effects are usually rather weak in classical systems. Quantum interference enhances them tremendously. Mesoscopic effects become increasingly important with miniaturization of the devices. As to the nanostructures, these effects simply dominate. We will briefly discuss the history and current status of the theory of quantum transport and its connection with the general description of complex quantum integrable and chaotic systems.