

EINLADUNG

zum Vortrag von

Prof. Dr. Wolfgang P. Schleich

Abteilung für Quantenphysik, Universität Ulm

über

Quantum Ulm sparrow

am

Dienstag, 7. Juni 2005, um 17.30 Uhr

im Großen Hörsaal des Instituts für Experimentalphysik der Universität Wien
1090 Wien, Strudlhofgasse 4 / Boltzmannngasse 5, 1. Stock

Abstract:

Once upon a time, the continuing construction of the Ulmer Münster towers made it necessary to haul big pieces of lumber through the narrow gates of the city. It is a famous tale that once a teamster and his lorry were prevented from entering the city by logs which lay crosswise on the cart but were wider than the gate. The first reaction of the stupefied citizens was to enlarge or tear down the gate. Fortunately, this desperate measure was made unnecessary when the people observed a sparrow with a straw in his beak trying to fly through the narrow entrance of his nest. While passing the slit he rotated the straw to line it up with his path. Since then the sparrow has become a symbol of Ulm and till today he rests on the roof top of the Ulmer Münster.

In classical physics scattering of an object from a slit is determined by the geometrical cross section. This statement summarizes the lesson drawn from the Ulm sparrow. But how does this situation translate into the microscopic world? In this talk we consider the scattering of a rotor from a slit in the limit when the length of the rotor is larger than the size of the slit. We show that due to the wave nature of the rotation the transmission probability is reduced by an exponential factor originating from the tunneling through a potential imposed by the boundary conditions of the slit. Moreover, we discuss possibilities to realize such an experiment using fullerenes and Bose-Einstein-condensates.