UNIKASSEL
VERSITÄT

Physikalisches Kolloquium

Thursday, 16.01.14, 17:15, HS 100
Reception with coffee & cookies 16:45

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The role of orientation in surface scattering of vibrationally excited molecules

Abstract

Molecules typically must point in specific relative directions to participate efficiently in energy transfer and reactions. For example, Förster energy transfer favors specific relative directions of each molecule's transition dipole [1] and electron transfer (ET) between gas-phase molecules often depends on the relative orientation of orbitals [2]. Surface chemical reactions can be many orders of magnitude faster than their gas-phase analogs, a fact that underscores the importance of surfaces for catalysis. In this talk I show that the vibrational relaxation of NO – an example of electronically nonadiabatic energy transfer which is driven by an electron transfer event [3]– is dramatically enhanced when the molecule approaches a Au(111) surface with the N-atom oriented towards the surface. This represents a rare opportunity to investigate the steric influences on an ET reaction happening at a surface.

[1] T. Förster, Annalen der Physik 2 (1948) 55.
[2] P.R. Brooks, P.W. Harland, S.A. Harris, T. Kennair, C. Redden, J.F. Tate, Journal of the American Chemical Society 129 (2007) 15572.
[3] J.W. Gadzuk, Journal of Chemical Physics 79 (1983) 6341.

All of you interested in physics are cordially invited!

Contact: Prof. Dr. T. Giesen, More Information: uni-kassel.de/go/physikalisches_kolloquium