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Theoretical Studies of Surface Diffusion

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In this talk, I will discuss different theoretical approaches to the study of surface diffusion. These include analytic Mori formalism, Langevin Dynamics simulation studies and Lattice gas models. The topics investigated include the dependence of the prefactor in the Arrhenius form on the coupling of the adatom to the substrate excitations and the relations between the collective and tracer diffusion. The various theoretical approaches are applied to three adsorptions systems and the results are compared with available experimental data. These systems are

(1) Sodium atoms adsorbed on Cu(100) surface,

(2) Oxygen atoms adsorbed on W(110) surface

and (3) Complex polymer chain molecules adsorbed on silver surfaces.