
MM 47: Invited Talk (Hauptvortrag): Bennewitz

Time: Wednesday 18:30–19:00

Location: H24

Invited Talk

MM 47.1 Wed 18:30 H24

Microscopic friction mechanisms on metal surfaces —

•ROLAND BENNEWITZ — INM - Leibniz-Institute for New Materials, Saarbrücken, Germany

The description of friction on metal surfaces is normally based on concepts suggested by Bowden and Tabor. They identified the real area of contact, i.e. the sum of microscopic asperity contacts, as a key parameter. They also proposed how to predict contributions of shearing and ploughing to friction based on bulk properties of the materials. Friction force microscopy is an excellent tool to investigate microscopic

mechanisms in friction for a single asperity. A fascinating result is the observation of a modulation of friction forces with the periodicity of the atomic surface lattice. These results are normally described by the Tomlinson-Prandtl model, a molecular ball-spring model which reflects only surface properties. We will discuss how experimental results obtained for clean metal surfaces in ultra-high vacuum challenge both descriptions. Furthermore, we will present results for the modification of microscopic friction on metal substrates by molecular lubrication layers, including graphene, self-assembled monolayers, and ionic liquids.