Surface Science
WS 2020/21
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1. Introduction

2. Geometric structure of a surface

3. Electronic structure of a surface

4. Microscopy

5. Scanning tunneling microscopy
  5.1   Quantum tunneling
  5.2   Local density of states
  5.3   Sub-Ångström positioning, piezoelectric effect, feedback control
  5.4   Vibration isolation
  5.5   Tip preparation, sample preparation, molecular deposition methods
  5.6   Imaging modes

6. Atomic force microscopy
  6.1   Lennard-Jones potential (Pauli repulsion, van der Waals force)
  6.2   Force sensors (cantilevers, tuning forks)
  6.3   Contact/Non-contact mode AFM

7. General aspects of scanning probe microscopy
  7.1   Noise in SPM measurements
  7.2   Atomic/molecular manipulation
  7.3   Lateral and vertical manipulation
  7.4   Single-molecule chemical reactions
  7.5   Surface probe spectroscopy
  7.6   Selected examples (inelastic electron tunneling spectroscopy, force spectroscopy)
  7.7   Spectroscopic mapping
  7.8   Applications and recent advances in SPM