

Temperature Dependent Surface Measurements on Bi(111) by He Atom Scattering

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Bismuth (Bi), with its remarkable differences in bulk and surface properties in addition to strong spin-orbit coupling represents an interesting candidate for measurements with a strictly surface sensitive technique like helium atom scattering (HAS) [1].

Elastic and inelastic HAS studies of the Bi(111) surface were performed at our institute. Besides an interesting shape of the Rayleigh mode in the surface phonon dispersion curve the measurements also revealed a stronger surface corrugation than observed with HAS from other metallic surfaces [2].

Recently, we performed temperature-dependent investigations of Bi(111) between 110 and 300 K. The repression of the multiphonon background in inelastic time-of-flight measurements gives rise to clearly resolved surface phonon modes. With temperature-dependent elastic HAS a determination of the surface Debye temperature was possible. In-between the elastic diffraction peaks hints were found for bound state resonances which are unusual for metallic surfaces. These indications are subject of further measurements and analysis.

REFERENCES

- [1] Hofmann P 2006 *Prog. Surf. Sci.* **81** 191
- [2] Tamtögl A et al. 2010 *J. Phys.: Condens. Matter* **22** 304019