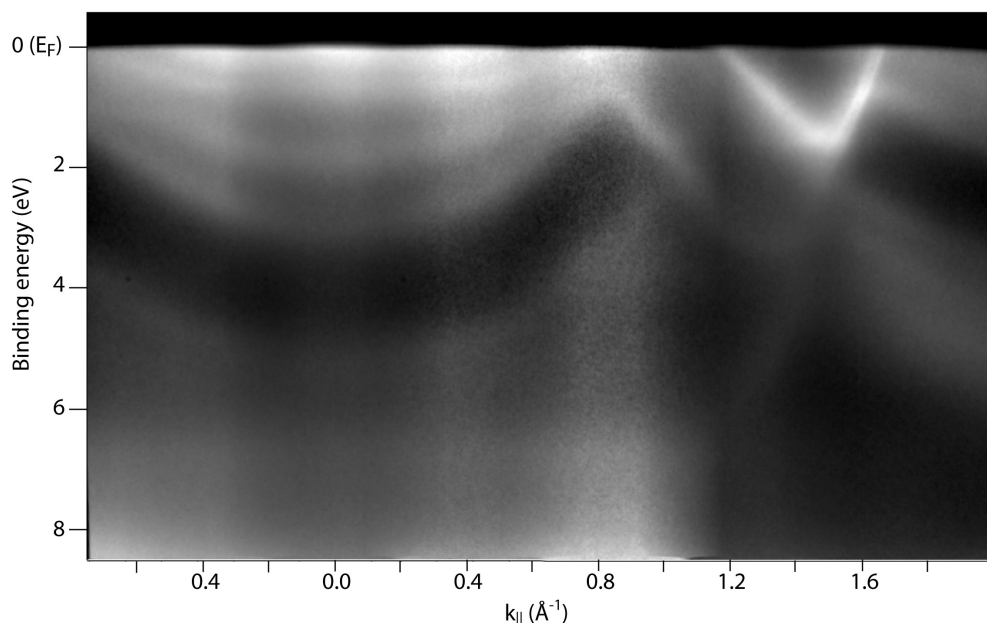


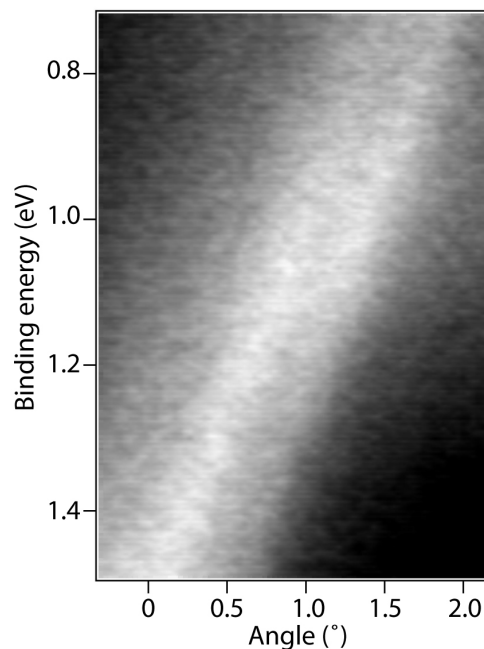
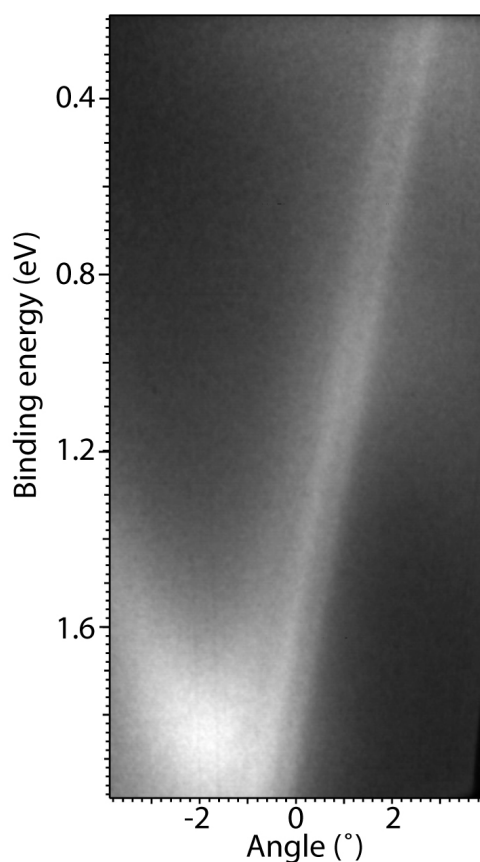
High Angular Resolution Data from the Band Structure of Thin Layers of Indium on Si(111)

Application Notes

The band structure of thin layers of indium on Si(111) was measured with ARPES. Due to electron confinement in the direction perpendicular to the surface, quantum well states (QWS) are formed. The experiments were performed at the BESSY II 10m NIM beamline at the U125/2 undulator, which has an energy resolution of less than 1 meV, and a small spot size. The photon energy for all measurements was 26 eV. The energy resolution obtained at the Fermi edge for this data at a pass energy of 5 eV (~ 35 meV) corresponds to the sample temperature of approximately 50 K. The entrance slit size was 0.5 mm.



Cut through the surface Brillouin zone for a 12 ML thick In film on Si(111) acquired with PE = 50 eV. The features around the zone center are the QWS derived from the $5p_z$ bands. In this image one can see a splitting of the band at approximately 1.6 \AA^{-1} . This splitting occurs in the $5p_{x,y}$ derived QWS bending back at the Brillouin zone boundary. The full angular span of both data sets is 87° , indicating the relatively constant background and possibility to resolve features at higher angles. This image is a compilation of six images, hence the intensity variations, taken with a PHOIBOS 100 analyzer with the 2D-CCD Detector. Data courtesy of J.H. Dil and K. Horn (Fritz Haber Institut, Berlin).



Splitting of the bands around 1.6 Å^{-1} , measured with the Medium Angular Dispersion lens mode at 10 eV pass energy. Here the peak splitting is resolved better and the separation of the lines is less than 0.23° . The angles are with respect to the center of the raw image. Data courtesy of J.H. Dil, T.U. Kampen and K Horn (Fritz Haber Institut, Berlin).

$$\Delta\theta < 0.23^\circ$$

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