Quasi 1D Structures at the Bi/InAs(100) Surface

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Abstract. Thin Bi films are interesting candidates for spintronic applications due to a large spin-orbit splitting that, combined with the loss of inversion symmetry at the surface, results in a band structure that is not spin-degenerate. In recent years, applications for topological insulators based on Bi and Bi alloys have as well attracted much attention. Here we present ARPES studies of Bi/InAs(100) interface. Bismuth deposition followed by annealing of the surface results in the formation of one full Bi monolayer decorated by Bi-nanolines. We found that the building up of the interface does affect the electronic structure of the substrate. As a consequence of weak interaction, bismuth states are placed in the gaps of the electronic structure of InAs(100). We observe a strong resonance of the Bi electronic states close to the Fermi level; its intensity depends on the photon energy and the photon polarization. These states show nearly no dispersion when measured perpendicular to the nanolines, confirming their one-dimensionality.

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