SPIN STRUCTURE OF NON-MAGNETIC SURFACES BY ANGLE RESOLVED PHOTOEMISSION

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Theory of angle and spin-resolved photoelectron spectroscopy of systems with strong spin-orbit interaction will be presented, in particular, photoemission from spin-split and spin-polarized states will be discussed.

Starting with a complex-band-structure view on the Rashba splitting of surface states, a qualitative analysis of the Rashba effect for surface as well as for bulk continuum states will be given within a one-dimensional model [1]. Special attention will be paid to the spin polarization of the photocurrent from bulk continuum states, which has been recently experimentally observed on Bi(111) [2] and W(110) [3]. The role of photoemission final states and dichroism effects will be discussed.

Calculations of the spin-resolved photocurrent from Bi(111), W(110), and the Ag_2Bi surface alloy within an *ab initio* theory of photoemission will be presented based on the one-step formalism, in which the final states are treated as time-reversed LEED states. The theory employs the Bloch waves approach to electron scattering within the augmented plane waves formalism [4]. Relativistic effects are included within the two-component approximation. The spin-orbit coupling is shown to lead to a Rashba-type spin polarization of the angle-resolved photocurrent from bulk continuum states of a non-magnetic system.

References

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