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Momentum-resolved hard X-ray photoemission

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Photoelectron momentum microscopy is used to study the dispersion of electronic properties at the Fermi level, states of the valence band using photoelectron energy, momentum and spin analysis. We investigated crystalline samples of Mo and Ge on circular dichroism in the angular distribution (CDAD). The results were obtained on the P22 and P04 hard and soft X-ray lines at the PETRA-III synchrotron radiation source (DESY, Hamburg). P22 employs a diamond phase retarder at hv=6 keV, while P04 provides tunable circular polarized light between hv=250 and 2700 eV. All bands carry a strong CDAD signature, which reaches up to 80 %. The asymmetry shows a zero-line, when the photon beam coincides with a mirror plane of the crystal in the patterns at 0° and 90°. For arbitrary angles, for example 30° and 60° the symmetry is broken. The angular dependence complements earlier work on CDAD. Similar zero lines also appear in the XPD patterns of core levels, as exemplified for Ge 3p photoemission at hv = 6 keV.

Category

Solid State (Experiment)

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