DICHROMATIC SIGNAL EXCITED BY CIRCULAR POLIZED LIGHT SURFACE STATE

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We have investigated the dichromatic signal in High Tc superconductors, graphene and in Au(111). The angle-resolved photoemission intensity calculations are based on the one-step model and multiple-scattering theory. In case of HTSC's and graphene non-relativistic approach was used, but in case of Au fully relativistic formalism is applied.

The Dirac-like electronic structure of graphene originates from the equivalence of the two basis atoms in the honeycomb lattice. We show that the characteristic parameters of the initial state wave function (sublattice symmetry and isospin) can be determined using angle-resolved photoemission spectroscopy (ARPES) with circularly polarized synchrotron radiation. At a photon energy of $h\nu = 52$eV, transition matrix element effects can be neglected allowing us to determine sublattice symmetry and isospin with high accuracy using a simple theoretical model.

The behavior of the dichromatic signal of the Au(111) surface state at Fermi energy is complicated and we have found 13 different patterns of dichromatic signal with photon energies in the range of $7 \ldots 100$ eV.

The origin of the photon energy dependence in dicromatic signal is discussed.