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Probing the surface magnetic properties via Auger-photoelectron coincidence spectroscopy GIAN PAOLO BRIVIO, GUIDO FRATESI, Department of Materials Science, University of Milano Bicocca, Italy, MARIO ITALO TRIONI, CNR- National Research Council of Italy, ISTM, Milano, Italy, ROBERTO GOTTER, IOM-CNR, Basovizza, Trieste, Italy, GIANNI STEFANI, Department of Physics, University of Roma Tre, Italy — Auger-photoelectron coincidence spectroscopy (APECS) via a dichroic effect is a suitable tool to study complex systems such as magnetic thin films and multilayers. We present clear evidence for such a dichroic effect in the M_3VV Auger line shape of Fe films on Cu(001) measured by angle resolved APECS showing final state spin selectivity (triplet vs. singlet components). Using the Fermi Golden rule and the density functional theory formalism, the Auger spectrum and its angular distributions are computed. For magnetic systems, the spin dependence of the Auger matrix elements allows one to work out the individual multiplet contributions to the Auger spectrum. For an accurate interpretation of experiments we also take into account the valence hole-hole interaction affecting the Auger line shape by the Cini-Sawatzky theory but considering a spin dependent on-site interaction U. The calculated angular distribution, in case of a non-spherical ionized core level (e.g. l=1, m=0), follows a non-trivial behavior in agreement with experiment.

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