

Photoemission Spectroscopy: Fundamental Aspects

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Photoemission spectroscopy is one of the most widely used tools to investigate electronic and spatial structures of matter in different states of aggregation. Though most of the photoemission can be interpreted on the basis of the simple Einstein equation, the many body behaviour of the ionized system prevents from interpreting photoemission spectra in terms of single particle binding energies only. By the help of simple atomic and molecular examples, it will be shown that the complexity of the many particle response to the photoionizing perturbation provides a wealth of phenomena, such as chemical shift and multiplet splitting, that are used to shine light on several different properties of the aggregates. Distribution in angle of the photoelectron will be also briefly discussed and possible applications to investigation of the symmetry of the ionized states will be outlined. Non radiative decay of the core holes created in a photoionization will be also discussed and the Auger spectroscopy based on this process will be briefly outlined. Finally, the concept of resonant photoemission will be introduced.