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A soft x-ray resonant inelastic x-ray scattering (RIXS) syllabus

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Abstract content

The main ideas that make RIXS a very useful tool to study the electronic structure of solid compounds will be presented in this work. This photon-in photon-out technique allows a direct determination of symmetry and site selected density of states, both occupied and unoccupied. A basic experimental configuration and calculations using atomic multiplet models to interpret RIXS spectra will be discussed. Transition metal fluorides and oxides will be used as examples of RIXS work that provides crucial electronic structure information. For instance, a comparison of absorption and emission spectra at the fluorine K and metal L2,3 edges allows a detailed study of the evolution of the Mott-Hubbard transition metal di-fluoride insulators. A simple extrapolation of these results to the corresponding monoxides is in very good agreement with the Zaanen-Sawatzky-Allen model. For the same compounds RIXS spectra at the metal L2,3 edge give information about d-excited and charge transfer states. It will also be shown that RIXS spectra give a detailed information about the fast decay dynamics of the 2p_{3/2} hole in ionic orthovanadates and about the symmetry and nature of the gap of the lanthanum-strontium cobaltates.

Summary

Primary author(s) : Prof. JIMENEZ-MIER, Jose (ICN-UNAM)

Co-author(s) : Dr. HERRERA-PEREZ, Guillermo (CINVESTAV); Mr. OLALDE-VELASCO, Paul (Instituto de Ciencias Nucleares, UNAM); Mr. CARABALI-SANDOVAL, Giovanni (Instituto de Ciencias Nucleares, UNAM); Prof. MOEWES, Alexander (University of Saskatchewan, Canada); Dr. WILKS, Regan (University of Saskatchewan, Canada); Dr. YANG, Wan -Li (The Advanced Light Source, Berkeley); Dr. DENLINGER, Jonathan (The Advanced Light Source, Berkeley); Prof. EDERER, David (Tulane University); Prof. CHAVIRA, Elizabeth (Instituto de Investigaciones en Materiales, UNAM)

Presenter(s) : Prof. JIMENEZ-MIER, Jose (ICN-UNAM)