Réunions scientifiques

Séminaires

Soft X-ray Scattering Dynamics Close to Core Ionization Thresholds in Atoms and Molecules in Gas Phase

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Invité par Catalin MIRON

Vendredi 5 Octobre à 15h00
Amphi du Bât. Accueil Soleil

Today a gas phase photoemission experiment is rather straightforward to perform at energies far above threshold, and the difficulty increases as the photon energy decreases towards the threshold energy. This difficulty arises from several factors such as additional broadening and energy shift induced by post collision interaction (PCI), background from secondary electrons, lower transmission in the analyzer for low kinetic energy electrons etc.

At threshold a standard photoemission spectrometer has almost no efficiency. To overcome this threshold photoelectron spectrometers have been used. These spectrometers overcome a great deal of the problems associated with measuring low kinetic energy electrons in a ”normal” photoemission spectrometer.

However – one problem that the threshold photoelectron spectrometer cannot overcome is the additional broadening and energetic shift induced by the PCI effect as it is inherent to the decay process.

Using X-ray-emission-threshold-electron coincidence (XETECO) I will show a method to record spectra similar to photoemission at threshold, while eliminating the PCI effect. By detecting threshold photoelectrons in coincidence with X-rays emitted in the core hole decay it is possible to separate the two main decay channels; the Auger and fluorescence decay. As the PCI effect is strongly associated with the Auger decay the electrons detected in coincidence with X-rays emitted in the core hole decay can be interpreted as not having undergone the PCI shift.

I will present some problems associated with detecting low kinetic energy electrons as discussed above. This will lead up the introduction of XETECO that has been used to record high resolution threshold electron spectra interpreted as being free from the PCI effect.

I will also present some of the results obtained using XETECO where I make it plausible that the spectra can be interpreted as threshold photoelectron spectra free from PCI. Furthermore I will present different interpretations for the results and discuss the difficulties in data analysis.

To conclude a possible approach to increase the statistics using XETECO will be presented together with an approach where the coincidence technique no longer is limited to photon energies at threshold but where the photon energy can be increased continuously to energies far above the threshold.

Formalités d'entrée *: accès libre dans l'amphi du Pavillon d'Accueil. Si la manifestation a lieu dans le Grand Amphi Soleil du Bâtiment Central, merci de vous munir d'une pièce d'identité (à échanger à l'accueil contre un badge d'accès).*

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