Vortragsankündigung

Mittwoch, 21. November 2018, 11.15 Uhr

Seminarraum I (JAK2AOG1.33), Jakob-Haringer-Straße 2a

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"Tunable UV Resonant Raman scattering at Elettra – Sincrotrone Trieste: an innovative spectroscopy facility for material science"

Raman spectroscopy has been demonstrated to have a wide applicability to most forms of matter and it constitutes a non-destructive methodology for providing molecular information on many different materials, including liquids, gels, polymers and bio-macromolecules trough the investigation of their vibrational motions. Thanks to the resonance effect, UV Resonant Raman (UVRR) scattering offers several advantages with respect to spontaneous Raman spectroscopy, such as the significant increment of the detection limit and the selectivity of the enhancement of the vibrational modes associated to specific chromophores present in the system. These conditions, together with the strong reduction of the interfering fluorescence background, determines the usefulness of UVRR spectroscopy as highly sensitive and selective spectral probe for the study of many open issues in the material science, ranging from the electronic properties of nanostructures and strongly correlated materials to biophysical and biochemical processes [1]. In the past few years, there was a growing in the use of UVRR spectroscopy especially for addressing open issues in biological field, thanks also to the advancements in laser technology and the development of high efficiency array detectors for the entire UV-visible region. However, the conventional laser sources suffer from the limitation of providing fixed wavelength energies, while a tunable radiation source in the UV range allow to "map" the whole resonance landscape and to match with the best experimental conditions.
In this contribution, we will present a newly developed UV Resonant Raman scattering facility that exploits the tunability of UV synchrotron radiation source available at Elettra Sincrotrone Trieste [2], a multidisciplinary international research centre of excellence, specialized in generating high quality synchrotron and free-electron laser light and applying it in materials and life sciences. The setup available on beamline IUVS [3] enables to perform UVRR experiments with a fine tunable source in the range of excitation wavelengths 200-270 nm, resulting in an innovative spectroscopy facility to be used for approaching a large arrays of open issues especially for researchers interested in material science. Selected case studies will be discussed in order to show the useful of UVRR method and the areas of interactions with other research interests.

[1] A. A. Asher, Anal. Chem. 65(2), 59 (1993)
[2] F. D'Amico, M. Saito, F. Bencivenga, M. Marsi, A. Gessini, G. Camisasca, E. Principi, R. Cucini, S. Di Fonzo, A. Battistoni, E. Giangrisostomi, C. Masciovecchio, Nucl. Instrum. Methods. Phys. Res., Sect. A 703, 33 (2013)
[3] https://www.elettra.trieste.it/it/lightsources/elettra/elettra-beamlines/iuvs/iuvs.html