Tunable UV Resonant Raman spectroscopy at Elettra: a tool for exploring the structural dynamics in biological matter

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It is known that Raman spectroscopy constitutes a non-destructive means to acquire molecular information on many different materials, including liquids, gels, polymers and bio-macromolecules trough the investigation of their vibrational motions. In this respect, UV Resonant Raman (UVRR) scattering experiments allows to extract additional insights with respect to conventional Raman measurements by exploiting the selective enhancement of vibrational bands associated to specific chemical groups or chromospheres within the sample. This condition, together with the strong reduction of the interfering fluorescence background, determines the usefulness of the UV resonance Raman effect as highly sensitive and selective spectral probe for exploring the structure and dynamics of a wide range of biological systems [1]. In this contribution, we present a newly developed resonant Raman scattering facility working in the UV spectral range that exploits the tunability of UV synchrotron radiation source available at Elettra Sincrotrone Trieste [2], a multidisciplinary international research center of excellence, specialized in generating high quality synchrotron and free-electron laser light and applying it in materials and life sciences. The UVRR setup available on IUVS@Elettra [3] results in an innovative spectroscopy facility to be used for addressing a large arrays of open issues especially for researchers interested in biological problems. Selected case studies will be discussed in order to show the useful of UVRR method and the areas of interactions with other research interests, with particular attention to the biological problems.

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[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