L-16 **Session B, Wednesday, 15.06., 11^{40} - 12^{20}**

Photoionization of atoms molecules and clusters with novel XUV light sources

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XUV spectroscopic investigations on the electronic structure of matter continuously profit from advances in laser and synchrotron radiation instrumentation. Photon flux and energy resolution achievable at third generation facilities, such as the Gas Phase beamline of the Elettra storage ring (Trieste, Italy) [1], have enabled for the last 2 decades thorough studies of inner-shell electron photoionization even with low density targets such as metal-organic vapours [2], clusters [3], as well as of thermolabile organic radicals [4] or biotic molecules [5].

More recently the interest of the physical chemistry-chemical physics community has been attracted by the opportunity of exploring also the temporal dynamics of isolated systems by means of novel state-of-the-art light ultrafast vacuum ultraviolet light sources. For this purpose two new beamlines capable of delivering fs- VUV photon pulses have recently been commissioned in the framework of the FERMI Free Electron Laser (FEL) facility [6]: the Low Density Matter beamline at FERMI [7, 8] and CITIUS [9], a state-of-the-art laboratory source, based on laser High Harmonic Generation on rare gases.

I will illustrate the different facilities, available to the Atomic and Molecular Physics Users' community of Elettra (Trieste, Italy) for the study of spectroscopy and dynamics of isolated systems, as well as recent developments in the instrumentation.

I will then present experiments where synchrotron radiation photoionization techniques have been applied to gas phase molecular targets of increasing complexity, ranging from molecules of biological interest, to metal containing molecules and clusters. The high resolution photoemission set-up for molecular vapours recently assembled in our collaboration with the group of prof. Carla Puglia (Uppsala University, Sweden) will be described. Data on aromatic and heteroaromatic systems of interest for organic electronics will be reported, in order to highlight the relevance of high quality XUV spectroscopic investigations for a thorough description of the electronic structure of oligothiophenes and polyaromatic hydrocarbons (PAH), such as biphenylene (fig.1) [10] and coronene (fig.2) [11, 12].

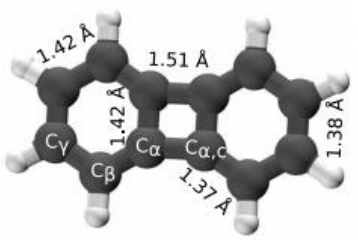

Figure 1. Biphenylene molecule.

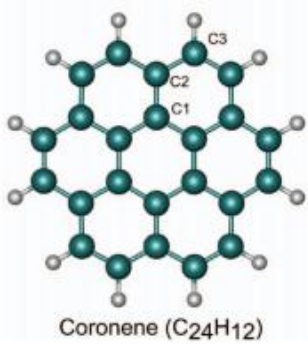

Figure 2. Coronene, with nonequivalent carbon atoms labeled.

Finally, I will also outline research opportunities opened in the field of atomic and molecular physics by the novel ultrafast light sources developed at Elettra. In particular I will discuss recent pump-probe experiments, which on one side are used for characterizing our novel VUV light sources [13], and on the other side are also paving the way for thorough investigations of electron dynamics in molecular excited states and for femtochemistry application of ultrafast VUV radiation.

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