

Séminaire SOLEIL

**Nanosolvation of biomolecules probed  
by VUV action spectroscopy****Aleksandar MILOSAVLJEVIĆ***(Institute of Physics Belgrade, University of Belgrade, Serbia)*

Invité par Laurent NAHON

**Lundi 2 juin à 14h00  
Grand Amphi SOLEIL**

Séminaires

The structure and functionality of biomolecules are intrinsically linked with their aqueous environment. There has been a long-standing effort to understand the effect of the surrounding water solvation shell on the conformation of biomolecules and how it influences both their functional properties and susceptibility to external factors (such as ionizing radiation). Particularly, the advent of modern ionization techniques and the ability of mass spectrometry to study isolated intact non-covalent complexes, lead to an intensive investigation of gradual solvation of biomolecules in recent years – the limit of the so-called microsolvation (or nanosolvation), referring to only a small and well-defined number of attached water molecules, has been conceived.

In the present talk, the recently developed experimental system at SOLEIL synchrotron, coupling a linear ion trap with a VUV radiation beamline, will be presented in details [1,2]. The potential of the VUV, as a new activation technique in tandem mass spectrometry, for both the protein sequencing and the action spectroscopy of isolated bio-macro-molecules will be briefly discussed on the bases of recent results [3,4]. Finally, the research on nanosolvation of biomolecules will be presented, particularly the role of a few water molecules in stabilization of a fragile peptide non-covalent complex or DNA building blocks, probed *in vacuo* by VUV action spectroscopy [5,6]. Perspectives and outlooks will be given regarding both research on nanosolvation and coupling the ion trap with soft X-ray [7] and highly charged ion beams.

[1] Milosavljević, A. R.; Nicolas, C.; Lemaire, J.; Dehon, C.; Thissen, R.; Bizau, J.-M.; Réfrégiers, M.; Nahon, L.; Giuliani, A. Photoionization of a Protein Isolated in Vacuo. *Phys. Chem. Chem. Phys.* **2011**, *13*, 15432–15436.

[2] Milosavljević, A. R.; Nicolas, C.; Gil, J.-F.; Canon, F.; Réfrégiers, M.; Nahon, L.; Giuliani, A. VUV Synchrotron Radiation: A New Activation Technique for Tandem Mass Spectrometry. *J. Synchrotron Radiat.* **2012**, *19*, 174–178.

[3] Francis Canon, Aleksandar R. Milosavljević, Guillaume van der Rest, Matthieu Réfrégiers, Laurent Nahon, Pascale Sarni-Manchado, Véronique Cheynier and Alexandre Giuliani Photodissociation and Dissociative Photoionization Mass Spectrometry of Proteins and Noncovalent Protein–Ligand Complexes, *Angew. Chem. Int. Ed.* **2013**, *52*, 8377.

[4] Alexandre Giuliani, Aleksandar R. Milosavljević, Konrad Hinsén, Francis Canon, Christophe Nicolas, Matthieu Réfrégiers and Laurent Nahon Structure and charge-state dependence of gas phase ionization energy of proteins, *Angew. Chem. Int. Ed.* **2012**, *51*, 9552.

[5] Milosavljević, A. R.; Cerovski, V. Z.; Canon, F.; Nahon, L.; Giuliani, A. Nanosolvation-Induced Stabilization of a Protonated Peptide Dimer Isolated in the Gas Phase. *Angew. Chem. Int. Ed. Engl.* **2013**, *52*, 7286–7290.

[6] Milosavljević, A. R.; Cerovski, V. Z.; Canon, F.; Rankovic, M. Lj.; Skoro, N.; Nahon, L.; Giuliani, A. (*submitted*)

[7] A. R. Milosavljević, F. Canon, C. Nicolas, C. Miron, L. Nahon, A. Giuliani, *J. Phys. Chem. Lett.* **2012**, *3*, 1191.

**Ce séminaire sera suivi d'une pause-Café**

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).

SYNCHROTRON SOLEIL

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