Postdoctoral position in the field of gas phase laser spectroscopy

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Keywords : molecular physics, gas phase, mass spectrometry, IR spectroscopy, laser desorption, microdroplets, biomolecules.

Context : Unravelling the structures of biomolecules to predict their function is a key process to understand their behaviour in multiple biological processes. This can be achieved using the selectivity and specificity of the gas-phase spectroscopic tools. Studies on controlled and finite size systems allow for comparison with theoretical predictions, with a high level of achievement. Nevertheless, these experiments in which the environment is removed to work on isolated species make difficult any extrapolation to the condensed phase. To overcome this difficulty, our strategy is to develop an innovative gas phase ion source which will allow to interrogate micro-hydration processes. This source, unique in France, is based on laser desorption of liquid microdroplets directly under vacuum[1].

Objectives : Within the framework of the "DEMONS" ANR project, the candidate will perform the experimental investigation of the desorption phenomena induced by the interaction of an infrared laser pulse (tuned to water absorption band) with a liquid water microdroplet (50 μm diameter) under vacuum. Underlying mechanisms are poorly undestood (supercritical phase transition, supersonic shock wave…) and the way energy is deposited into the microdroplet strongly influences the nature and quantity of desorbed species (biomolecules into the droplet). In a second step, the gas phase source will be coupled to a cryogenically cooled ion trap to get structural information on the desorbed species by performing infra-red multiphoton dissociation spectroscopic studies.

[1] Badri et al. *Rev. Sci. Instrum.* (2025) 109.

Profile : candidates are expected to hold a PhD in Physics or in Chemistry. Proficiency in one or more gas-phase experimental techniques (mass spectrometry, laser spectroscopy, ion trap) is expected.

Duration : 12 months with the possibility of an extension of 12 months.

Application via the RUBIS platform of the Sorbonne Paris Nord university before January 19, 2026 :

https://rubis.univ-spn.fr/offres/voir/200/en