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Thin liquid flat-jet for spectroscopy in the soft x-ray photon energy range

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X-ray absorption spectroscopy is a powerful and well-established technique to probe the electronic and structural properties of matter. However, considerable technological difficulties are faced when dealing with liquid phase samples in the XUV/soft x-ray photon energy range, where gas pressures close to the atmospheric ones causes the total extinction of the beam in few mm, leading to the requirement of high-vacuum (HV) or ultra-high-vacuum (UHV) conditions, therefore hindering the application to liquid samples [1, 2].
Recently, however, several new approaches have been published to present new solutions to this problem. Amongst them, the flat jet technique based on gas-dynamic sheet nozzles and colliding cylindrical jets [3, 4]. These techniques rely on the delivery of a flat microjet of liquid inside the experimental chamber, which can then be made to interact with synchrotron radiation.
In the past months, the CNR group active at the GasPhase beamline and the EIS-TIMER/TIMEX group of FERMI has worked on the development of a novel experimental setup to perform x-ray absorption measurements. The setup has been tested at the Circular Polarisation beamline using as toy samples aqueous solutions of ammonium iron(III) oxalate and glycine, obtaining evidence of absorption features at the Fe L-edge and C K-edge (Figure 1), proving the instrumentation capabilities and potential.
The aim of the proposed flash talk is then to present the setup design and preliminary results obtained in the development of the liquid flat microjet instrumentation for spectroscopic purposes.

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