

FAME-PIX: The Pioneering French High-Resolution Hyperspectral 3D X-Ray Microscope at the ESRF

A. Aguilar Tapia¹, E. Bazarkina², R. Boudjehem², A. Costes²,
J. C. Da Silva², B. Erickson³, Z. Hubert⁴, Ph. Jeantet², D. Jeguso²,
I. Kieffer⁴, A. Kulow², J. Lacipière², E. Lahera⁴, A. Longo², I. Maurin²,
D. Mornex², Q. Moutote⁴, A. Nassereddine², O. Proux⁴, M. Rovezzi⁴,
D. Testemale², J.-L. Hazemann²

¹ICMG / ²Institut Néel / ³Strobe / ⁴OSUG / ⁵CEA

ABSTRACT

While data acquisition in Ptychographic X-ray Computed Tomography (PXCT) has advanced, achieving hyperspectral nanoimaging still necessitates further speed enhancements. Identifying element locations and chemical speciation within a sample's microstructure demands numerous PXCT experiments at various photon energies. To enhance this capability, we can optimize instrumentation for expedited data collection and adjust analysis methods to minimize data requirements without compromising image quality. This can be achieved through instrumentation upgrades and refined data processing techniques that optimize data volume while preserving high resolution. We have already made progress in data analysis methods [1,2,3]. Presently, the MAGNIFIX project funding enables the construction of a new endstation on the FAME-PIX beamline at the ESRF. FAME-PIX integrates all aspects of spectral ptychography and spectral PXCT, making it the pioneer X-ray microscope in France with these capabilities. Advancements in instrumentation broaden the applications, while the need to characterize diverse samples also dictates the requirements for instrumentation. Reconstruction of the beamline has been achieved, except the experimental nanoprobe which is being prepared in the manufacturer's workshop. FAME-PIX is being superseding the preceding FAME beamline at the ESRF port BM30. FAME-PIX will benefit from the small stable source of this port of the upgraded ESRF-EBS, which is approximately 40 μ m $\times$ 40 μ m. In this poster, we will introduce the FAME-PIX ptychography endstation, the novel F-CRG instrument that will confer PXCT with spectral capabilities, thereby unlocking novel opportunities for characterizing heterogeneous materials.

REFERENCES

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