

## NeXT 2.0, the new Neutron and X-Ray Tomograph at ILL Abstract: attached

NeXT-Grenoble is the Neutron and x-ray tomograph born in 2015 from a collaboration between the Institut Laue-Langevin (ILL) and University Grenoble Alpes (UGA). This instrument has undergone a major upgrade to further expand the portfolio of contrast options. This is the result of a collaboration between the initial partners (UGA and ILL) plus the Helmholtz-Zentrum Berlin (HZB), also via the newly founded international mixed research unit NI-Matters. This upgrade also adds MoTo, a Monochromatic Tomograph designed with grating interferometry and polarized neutron imaging in mind.

The upgrade has improved the highest attainable spatio-temporal resolutions by increasing the maximum flux (expanding the accessible collimation ratios L/D) as well as by upgrading the range of detectors. The simultaneous x-ray imaging has also been improved to explore a broader range of geometrical configurations. An improved sample stack helps automate and expands the possibilities (in size/weight) of in-situ apparatus that can be easily installed on the instrument, as well as adding a laminography option.

A number of new contrast options have also been added: a velocity selector as well as a double crystal monochromator provide versatile energy selection. A grating interferometer allows the characterization of heterogeneities on the scale of 0.1  $\mu\text{m}$  to 10  $\mu\text{m}$  and above through dark-field imaging, while differential phase contrast can be employed to differentiate even modest variations in the refractive index. The new instrument also has a native integration of neutron polarization equipment in order to perform vectorial tomographies of magnetic fields.

This presentation will provide an overview of the science made at NeXT in the last years, detail the upgrade of NeXT and of MoTo and highlight new scientific venues that will be explored thanks to these new options.

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