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angular information about the sample, thus enabling both enhancing the depth of field (DOF) and performing scanning-free 3D reconstruction, while maintaining diffraction limited resolution. We present results obtained with both three-dimensional phantoms and biological samples, demonstrating that CPM enables improving the resolution by a factor of 4, for a given DOF. We also compare the results obtained by conventional CPM with the ones obtained by performing angular measurements in the Fourier plane of the objective lens, where spatial filtering is performed for edge enhancement.

TXRF/GIRXF high precision laboratory setup with high-flux monochromatic sources for archeometric applications.

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LANDIS XRAYlab is developing an instrument for experiments near total reflection conditions, that enhances the signal form the first few nanometers while suppressing the contribution from the bulk of the sample. By changing the angle of incidence around the critical angle (grazing incidence conditions), the depth profile of surface coatings can be directly probed, making this method particularly suited for the study of thin surface layers found in many archaeological artifacts. Since both the critical angle for total reflection and the penetration depth at a given angle of incidence are dependent upon the incident energy, high-precision TXRF and GIRXF are traditionally implemented within synchrotrons (where highly monochromatic X-ray beams with little to no divergence are available), while table-top instruments are limited by both the directionality and monochromaticity of the incident beams. Thanks to the recent integration of highly monochromatizing optics into compact X-ray tubes for laboratory applications, such compromises are no longer necessary. In this work, we present the characterization of a monochromatic laboratory self-assembled set up for TXRF and GIXRF measurements.

Transmission electron microscopy for the analysis of defects induced in graphene oxide by ion irradiation.

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Sheets of oxidized graphene (GO) assume a static, non-flat configuration, with apparently random out-of-plane microscopic deformations, in which the surface normal varies by several degrees. As is well known, the irradiation of oxidized graphene with ionic beams causes the removal of the functional oxygen groups from the sheet. This process does not improve the flatness of the sheet, on the contrary, it increases deformation in a dose-dependent manner. The electron diffraction, in particular, highlights these deformations through the enlargement of the spots. This enlargement involves both the direction normal to the reciprocal lattice vectors and the parallel one. The first deformation is related to the non-planarity of the surface, the second to the strain caused by the rearrangement of the deformed lattice. Such