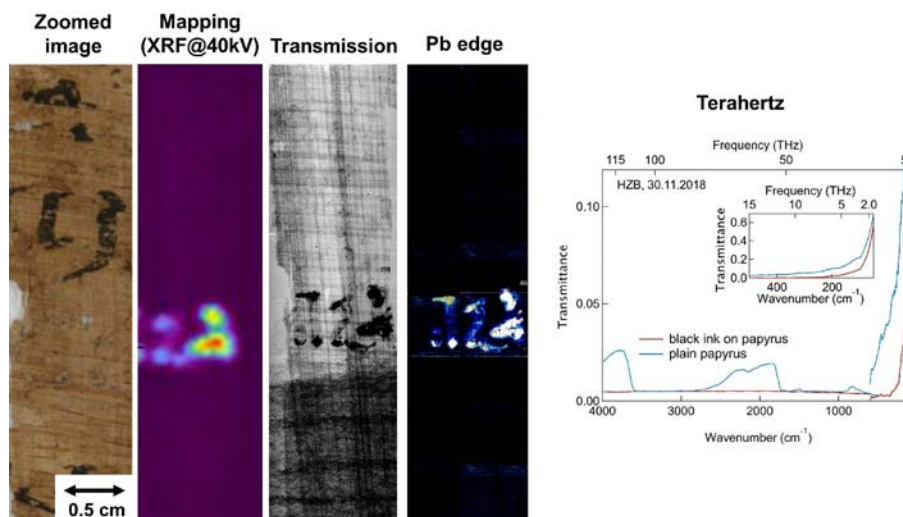


# Accessing inks on Egyptian papyri using synchrotron X-ray techniques

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In the Egyptian Museum and Papyrus Collection, Berlin, a multitude of papyrus manuscripts are stored. As part of the “Elephantine” project, funded by an ERC starting grant, we attempt to gain access to hidden text. Most of the fragments are very fragile, deformed, with some rolled or folded [1]. Papyri from the Old and Middle Kingdom were typically written with carbon ink. Consequently, these fragments show no absorption sensitivity for hard X-rays. Also, other inks, i.e. ferrous or plumbiferous inks, have been used in those times. Latter inks provide a sufficient sensitivity for absorption edge radiography and tomography in order to distinguish between writing and base material. This technique was applied using synchrotron X-rays at the BAMline at BESSY II [2].



**Figure 1:** Method development to access hidden text.

Due to the low contrast between carbon ink and the papyrus substrate and the low absorption edges of carbon in the range of soft X-rays, methods related to those techniques do not work for carbon-based inks. Recently, THz radiography, applied to planar fragments turned out as a suitable methodology which enables to access text written with carbon ink as well (see the right part in the figure and [3]). Moreover, X-ray scattering techniques could be an alternative approach for detecting carbon ink writings on ancient papyri. First results, which were generated at PETRA III P03, will be presented.

## References

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