To boldly scan, where no one has scanned before: *in-situ*

MA-XRF in Rameside tombs of the Theban Necropolis

Matthias Alfeld[(1)], Silvia Pedetti[(1)], Philippe Martinez[(1,2)] and Philippe Walter[(1)]

(1) Sorbonne Universités, UPMC Univ Paris 06, CNRS, UMR 8220, Laboratoire d'archéologie moléculaire et structurale (LAMS), 4 place Jussieu 75005 Paris, France
(2) Mission Archéologique Française de Thèbes-Ouest, Centre d'Étude et de Documentation sur l'Ancienne Égypte (CEDAE) Ministère d'Etat des Antiquités, 3 rue El Adel Abou Bakr - Zamalek Le Caire
email: matthias.alfeld@upmc.fr

The dry climate of the Egyptian desert has preserved a significant part of the colorful decoration of the ancient temples and tombs over several thousand years to this very day. The reign of Ramses II (1303-1213 BC, r. 1279–1213 BC) produced some of the most impressive buildings and art-works of the ancient world.

Many ancient, polychrome objects were brought from Egypt to Europe, when Egypt became comfortably accessible to Europeans in the 19th century. These objects have been subject to many scientific investigations. However, logistical challenges limited the scientific investigation of pigments in Egypt to comparably few studies with mobile instruments.

Mural painting in the subterranean tombs are not accessible to conventional XRF scanner, given the narrow spaces and uneven grounds. The Laboratory for Molecular and Structural Archeology (LAMS) has developed a range of specialized instruments to be used in challenging work environments, among them a lightweight MA-XRF scanner, whose capabilities were demonstrated in the investigation of archaic Greek polychrome statues [1].

We used this scanner in the investigation of two tombs from the Necropolis of Theban West from the period of Ramses II, containing well-preserved mural paintings.

In spite of the strict formalism of the paintings, a surprisingly high degree of variability in the execution of the paintings was found. The pigments used to achieve apparently identical effects varied throughout the same tomb, as did the use of underpainting. Many of these effects would not have been discovered by point analysis as a differentiation between local, random variations and misalignment of superimposed paint layers is difficult to be detected.

These findings provide new insights in the work practice in mural paintings in ancient Egypt during the Rameside period and will be continued in the framework of the long-term French Archeological Mission in Theban West (MAFTO).

[1] M. Alfeld, M. Mulliez, P. Martinez, K. Cain, P. Jockey, P. Walter, Anal. Chem. 89(3), 2017, 1493–1500.