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# Analysis and documentation of historical artifacts using advanced imaging and spectroscopic techniques

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Documentation is extremely vital step that must be carried out in the field of historical objects preservation. They collect complementary information used for the study of artifacts. Photographic imaging was historically the main method used for archeological documentation as well as advanced diagnostic techniques.

An early 20th century Egyptian painting was documented using a combination of digital and computational imaging techniques: multispectral imaging, Reflectance Transformation Imaging (RTI), and lab-made scanning system. These methods were chosen with consideration for the long-term preservation and reuse of the data collected using well-documented and open-source standards.

In parallel spectroscopic techniques, Raman spectroscopy, Laser induced fluorescence, FT-IR and X-ray fluorescence are involved to investigate the used coloring techniques and pigments of the sample. A chromatographic investigation was conducted to identify the used organic pigments that used in that painting. The chromatographic results confirmed the results of spectroscopic techniques that we used. Results suggest that complementary use of different techniques offers a reliable methodology for identification and allow better understanding of the main type of pigments that used in that period of time by Egyptian artists. Further, the study with the support of the high resolution photographs provided additional information on the manufacturing style of the artist and revealed details and decorative elements of the desired objects, which are indiscernible under standard illumination. This study finally gave us a good estimation of the age of the of the paint that had been used in the artwork.