

SCANNING MACRO-XRF INVESTIGATION OF CARAVAGGIO'S "ST. FRANCIS IN MEDITATION"

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Scanning macro-XRF (MA-XRF) is a technique establishing in the analysis of historical paintings to acquire large (up to several square meters) elemental distribution images without damaging the painting. While until recently such investigations were limited to measurements at synchrotron radiation sources a new generation of mobile MA-XRF instruments makes the *in-situ* investigation of historical painting in museums and galleries possible.

Our current instrument consists of a 10 W Rh-anode transmission X-ray tube with a 1 mm Pb pinhole collimator that is mounted on a 60x60 cm² motor stage. Four SD-detectors are closely positioned around the X-ray tube. The instrument allows to acquire elemental distribution images of the main components in the paint with dwell times down to 0.2 s per pixel.

As elemental distribution images allow to visualize the pigment use, restoration treatments and changes in the paintings composition in yet unknown detail MA-XRF is a method made to study complicated art-historical questions.

In this contribution we present the results obtained on two versions of "St. Francis in Meditation" by Michelangelo Merisi da Caravaggio (1571-1610), complemented with results obtained on autograph Caravaggio paintings ("Supper at Emmaus" (Milan), "Penitent Magdalene" and "Rest in the flight to Egypt") by MA-XRF.

Caravaggio is considered today to be one of the most famous and influential painters of the Baroque period but contemporary written records of his life are fragmentary with few direct references that allow for the identification of his works. So many paintings are attributed to him based on stylistical considerations and indirect references, as in the case of the two versions of St. Francis. The *Carpineto* version, on display in the Galleria Nazionale d'Arte Antica in Rome (Italy), is considered to be the original painting, while the *Cappuccini* version, on display in the church of Santa Maria della Concezione is considered to be a copy after an original, but was considered the original painting for several years. Albeit this attribution is generally accepted still some doubt remained, especially as the incarnates of the *Carpineto* version were painted with vermilion, since Giovan Battista Bellori stated in his "Vite de' Pittori, Scultori et Architetti moderni" (Rome, 1672) that Caravaggio avoided the use vermilion in his figures, as it was a "poison of tints". Albeit Bellori's statement has been put into perspective by the finding of vermilion in works of Caravaggio, the usage of vermilion is still considered unusual for his works of art.

Our findings in general confirm the attribution of the *Carpineto* version as original painting and demonstrate in a striking manner how MA-XRF can visualize changes in the composition of the painting that illustrate the "searching hand" of the artist and no longer visible details of the painting that were not included in the *Cappuccini* version. Further our investigations show the use of vermilion in the incarnates of two of the autograph Caravaggio's, which directly contradicts the statement of Bellori.