VISUALIZING THE 17TH CENTURY UNDERPAINTING USING MOBILE AND SYNCHROTRON-BASED SCANNING MACRO-XRF

Matthias Alfeld* (1), Koen Janssens (1), Joris Dik (2), Pete. D. Siddons (3), Ernst van de Wetering (4)
(1) University of Antwerp, Antwerp, Belgium
(2) Delft University of Technology, Delft, the Netherlands, j.dik@tudelft.nl
(3) Brookhaven National Laboratory, NSLS, Brookhaven, New York, USA
(4) Rembrandt Research Project, Amsterdam, the Netherlands

* presenting author

In the study of 17th century Old Master Paintings, the *underpainting* generally refers to the first sketch of a composition. The underpainting is applied to a coloured ground using a monochrome, brown oil paint to roughly indicate light, shade and contours. So far, our methods to visualize the underpainting -other than in localized cross-sections- have been very limited. Neither infra-red reflectography nor neutron induced autoradiography have proven to be practical, adequate visualization tools. Thus, although of fundamental interest in the understanding of a painting's genesis, the underpainting has virtually escaped all imaging efforts.

In this contribution we will show that 17th century underpainting may consist of a highly heterogeneous mixture of pigments, including copper pigments. Based on literary and pictorial evidence of 17th century sources, we suggest that this brown pigment mixture is actually the recycled *left-over* of a palette scraping. With copper as the heaviest elemental component, we will hence show how scanning macro-XRF can be used to efficiently visualize the underpainting below the surface painting. The objects we studied include paintings from the workshops of Rembrandt and Caravaggio and we will discuss the significance of the underpainting's visualization in their art historical context. From a methodological point of view, we will present images acquired with mobile XRF and SR-XRF, proving the principle feasibility to use this method *in situ* in a museum environment.