

Scanning MA-XRF and multispectral NIR reflectography to unveil painting techniques of an Italian Futurist painter

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Elemental mapping by Macro X-Ray Fluorescence (MA-XRF) was used in combination with imaging analysis by multispectral Near-InfraRed (NIR) reflectography on the painting *Lago Umbro* (1942) by the Italian Futurist Gerardo Dottori. Scanning multispectral imaging in the near-infrared is used both to highlight differences in molecular properties of paint materials and for under-drawing inspection thanks to the different transparency of pigments in this spectral region [1]. On the other side, MA-XRF scanning was demonstrated to be a valuable tool in revealing and mapping hidden paint layers in a non-invasive way by application of both synchrotron radiation and, more recently, portable XRF instrumentation [2]. The combined use of the two former spectral imaging methods was crucial to study the painting technique of Dottori employed in *Lago Umbro*, as well as to unveil a hidden under-paint that provides evidence of a radical revision made by the artist. Dottori worked out a landscape up to the point of the final pictorial layers and, after, covered it with a completely different image. The good quality of the image data allowed to draw similarities between the composition which lies underneath the *Lago Umbro* and other paintings listed within the Gerardo Dottori's catalogue raisonné, signally some 1930s artworks belonging to the so-called *Aeropittura*. The measurement campaign was carried out *in situ* using portable instrumentation [1,3] available within the MOLAB laboratory and the results of point spectroscopic techniques, necessary for disclosing specific information on pigments and binder, were integrated with those of imaging analysis [4]. In this contribution an overview of the results from imaging and point analysis investigations is provided, giving emphasis to the great benefit achieved in the synergistic use of complementary techniques to provide deep insight into the artist's creative process. The investigation was performed within the Italian research project FUTURAHMA (<http://www.futurahma.it/en/home/>) financed by the Italian Ministry of Education, University and Research (MIUR) within the Future in Research 2012 program.

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