NON-DESTRUCTIVE AND PORTABLE METHODS TO IDENTIFY THE COMPONENTS OF WORKS OF ART AND THE ARTISTIC TECHNIQUES

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Non-destructive techniques, without any contact with the studied surfaces, able to be implemented without moving the work of art from its place of exhibition and leading to results in real time in the presence of the restorer or of the conservator are developing subjects. Qualitative and quantitative results obtained with different instruments will be presented and compared with OCT results.

The first portable instrument that we developed in order to study works of art is a gonio-spectro-photo-colorimeter in a back-scattered configuration. The recording of diffuse reflectance spectra allows the identification of pigments and dyes embedded in the upper layer of the works of art, by comparison with spectral databases.[1] The pigments can be of the same nature or mixed. The previous spectra also allow to calculate the corresponding trichromatic co-ordinates and to underline a glaze technique, compared to a pigment mixture one.[2] The same instrument can also be used as a goniophotometer where the luminance is recorded as a function of the back-scattered angle and the different gold applying techniques, such as gold leaves on a bowl, on a mixtion or gold embedded in a binder, can then be discriminated.[3]

When the white light of the previous instrument is replaced by UV-LED, UV-fluorescence emission spectra can be recorded. The comparison with a spectral database of reference varnishes then allow to identify the resin, the recipe and the state of degradation of an unknown varnish.[4] This identification can be implemented in the same time than pigment recognition on the same work of art.

Finally, confocal microscopy has been explored to image varnishes applied on paint layers. The surface state of both interfaces air/varnish and varnish/paint are simultaneously recorded and stratigraphic images are deduced. The varnish thickness is then easily measured, as with OCT. Moreover, it is possible to quantify the roughness, the correlation length of each interface and the leveling of the paint surface by the varnish can be visualized and studied according to the properties of the ground layer and of the varnish.[5]

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