

Casa Cardinale Ildefonso Schuster - Salone Pio XII ore 11:45 – 12:40

Sezione VI

Fisica applicata, acceleratori e beni culturali

Presiedono: RIFUGGIATO D. (INFN-LNS, Catania)

SENESI R. (Università di Roma Tor Vergata)

Relazione Generale

■ **Synchrotron radiation X-ray methods and non-invasive spectroscopies to preserve the beauty of colors in paintings.**

MONICO L.

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Within heritage conservation a grand challenge is the prevention of color change in paintings due to chemical alteration of pigments. Darkening or fading, often occurring along with loss of paint stability, affect numerous artworks in museums, with serious risks for their understanding, preservation and management. In this context, the use of synchrotron radiation (SR)-based X-ray methods has seen a considerable increase over the last two decades due to their capabilities to provide spatially resolved elemental speciation and structural information at the (sub)micrometer scale length. Notably, XRD, XRF and XAS investigations have been exploited to prove that redox reactions are responsible for the chromatic alteration of several pigments and to identify the nature of related degradation compounds. Moreover, macro-scale non-invasive measurements (from the IR to the X-ray range) by portable devices, performed *in situ* directly on paintings, have also given the possibility to visualize and map areas where paint components at major risk of degradation are present or alterations are currently in development. This paper reviews the most recent application of non-destructive/non-invasive X-ray methods (employing SR and traditional sources) combined with UV-Vis and vibrational spectroscopies to study the alteration processes of pigments, with a focus on the darkening of chrome yellows used by Vincent van Gogh and the fading of cadmium yellows and cadmium reds employed by Edvard Munch and Jackson Pollock. The contribution that the described experimental findings can make to the virtual reconstruction of original colors and the prediction of their change overtime will be also discussed.

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