

**Marco Cardinali**

### **X-ray Imaging Techniques and the Quest for Reliable Insight into Paintings**

In the first half of the 20th century, the most accurate and extensive attempt to apply radiography to art studies was carried out by Fogg Art Museum (Harvard) with the international x-ray campaigns managed by Alan Burroughs, who published the results in his *Art Criticism from a Laboratory* (Boston 1938). The evidence of criticalities in the method and limits in data interpretation arose sharp opposition by some scholars. Many pigments do not show up in the X-ray image, and x-ray selective transmission converts the three-dimensional response of the materials, which lie on distinct stratigraphic layers, into a two-dimensional image. Such limitations, and possible sources of misinterpretation, were taken into consideration as the field of radiography progressed through technological advancement. An instrument for x-ray stereography was introduced in the early 50's as a product of the research carried out in the newly-established Istituto Centrale del Restauro by Augusto Vermehren, a restorer who was also gifted at technological research. This instrument recorded the x-ray response of the painted surface, limiting the contribution of the support and maintaining the three-dimensional effect. A number of different techniques – i.e. radiography by electron emission, beta-radiography, autoradiography – were later developed in order to detect painting materials containing elements with low atomic weight. Such methods – specifically the autoradiography – enabled the researcher to separately register the x-ray response of the individual elements. This way, it was possible to obtain more refined and precise data on materials and art procedures, giving also a boost to applied science research and technical art history studies.