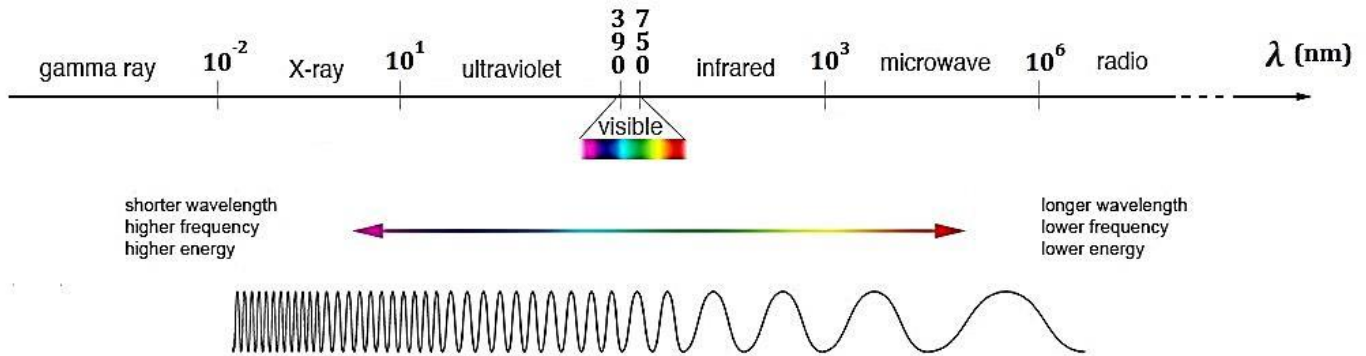


HOW CAN WE INVESTIGATE ARTWORKS WITH THE USE OF RADIATIONS?

A work of art is assessed, judged and commented on by a person viewing the object, itself dependant on the presence and intensity of light that is composed of electromagnetic radiations :



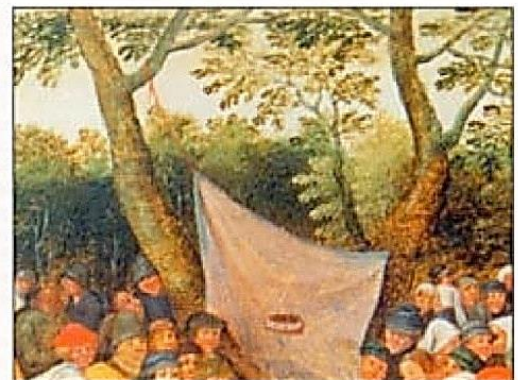
To see what is not visible, experts apply scientific methods to works of art that enable them to understand the past (preparatory drawings or retouches under the painted layer...) and the present (xylophage insects, the causes of current damage...), methods that include ultraviolet, UV and IR cameras, x-rays, tomographic cross-sections . . .

UV and IR cameras

UV and IR cameras are cameras that cover the range of infrared rays from 760 nm to 2,200 nm and that of ultraviolet rays from 400 nm to 200 nm. An examination at this range of infrared enables a penetration of the paint layer of paintings, depending on the composition of the pigments, and the discovery, of a preparatory drawing, a hidden signature or overpainting. Rays in the ultraviolet range have a wavelength that is considerably shorter and carry more energy than light. A camera that has been adapted for ultraviolet light enables a visualization of the various recent interventions to the surface of a painting, such as a signature that has been added or a restoration carried out.



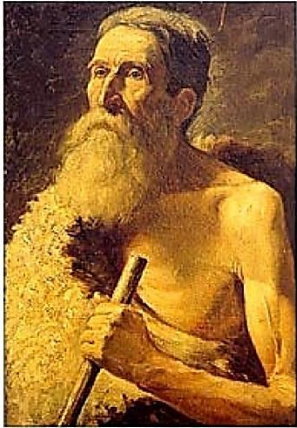
▲ View under UV fluorescence of a painting, oil on canvas, from the 18th century, restored.



Flemish paintings from the 16th. The infrared rays enable us to discover the preparatory drawings, undetectable using any other process, and older restorations ►

X-rays

Until computers were invented, x-rays were used in so-called conventional radiography to visualize a body or object through which such rays are projected onto a black and white photographic plate.



An x-ray radiography of a painting can reveal a signature (full of dense pigments such as lead) or a hidden work, as is the case here.



An x-ray radiography of this 18th century plate shows, in an undisputable manner, the extent of the gaps and restorations that are invisible to the naked eye.

X-ray fluorescence is a technique that analyses the mineral components of a surface. The operator sends a tightly channelled x-ray beam to a surface, the reflection of such rays being collected by a sensor linked to a computer that identifies, with the aid of a spectrum, the composition of the elements on the surface.

The emission of x-rays is also used in a scanning electron microscope to analyse mineral particles in paint layers. This method has the advantage of being able to analyse the composition and exact location of a particle one micron thick in a layer of paint. Through successive comparisons, the expert can determine if the pigment that is present was used at the time by the presumed artist and his workshop or if it is a pigment that predates the 19th century being used, for example, for a work presumed to be from the 16th century.

From <https://www.mariabaias.com/post/art-forgeries-how-to-identify-fake-paintings-using-science>

QUESTIONS:

- 1) Introduce on this document.
- 2) What are the common point and difference between UV, IR and X-ray radiations ?
- 3) What kind of information can we get with the use of UV radiations ? IR ? X-rays ?
- 4) Watch “[video](#)” and explain how we can identify fake paintings using science?
- 5) Present your work to one or your classmate ...