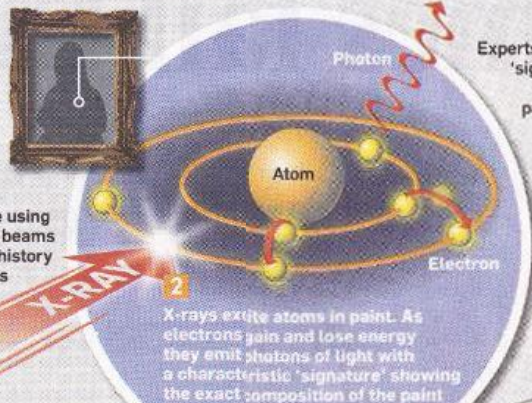


Van Gogh's Sunflowers is to be examined by x-ray imaging

### Art's x-ray secrets

**1** Scientists are using intense x-ray beams to reveal the history of old masters



**2** X-rays excite atoms in paint. As electrons gain and lose energy they emit photons of light with a characteristic 'signature' showing the exact composition of the paint

**3**

Experts use radiation 'signature' to see how work was painted, to seek older images below the top layer and to analyse the paint



Understanding chemical changes in paint aids preservation

Weave and composition of canvas can suggest links with other artworks

X-rays may reveal older images under main painting or even artists' fingerprints



The Van Dyck picture, previously thought to be by Rubens

# Sorry, Rubens – x-rays say Van Dyck

Science is turning our knowledge of art on its head and revealing painters' secrets. Jonathan Leake and Matthew Chalmers report

FOR centuries it was thought to be a masterpiece by Rubens but now *The Young Anthony*, an oil painting dating back nearly 400 years, has been shown to be by another artist altogether.

A scientific study, in which powerful x-rays were fired at the canvas to see what lay beneath, suggests that the painting, valued at £1m, is a self-portrait by Sir Anthony Van Dyck, a student of Rubens who became a court painter in England to Charles I.

For the art world, and for the Rubens House museum in Antwerp where the painting

hangs, the discovery is potentially embarrassing — calling their expertise into doubt. A study detailing the find will be published shortly.

It is just the latest in a series of cases where "synchrotron radiation", as the x-rays are known, has been used to reveal the secrets of world-renowned artists.

In one recent case *Old Man with a Beard* was upgraded to a Rembrandt. Critics had dismissed it as the less valuable work of one of his students.

In another, researchers confirmed that *Still Life With*

*Meadow Flowers and Roses*, whose authenticity was disputed for decades, was indeed a genuine Van Gogh.

They also found Van Gogh had painted it on top of a depiction of two half-naked wrestlers — an image he had described in letters but which was thought to have been destroyed.

The technique could revolutionise the art world, which has historically depended on human expertise rather than hard science.

"The technology that art historians use had been stagnating for the last 20 years," said Koen Janssens, professor of chemistry at Antwerp University where he has pioneered the use of x-ray beams to analyse works of art.

Janssens, who helped investigate all three paintings, said that what gave away the true origins of the Rubens painting

was the discovery of another image beneath it that was very similar to other works known to have been created by Van Dyck.

"The underpainting has similarities with other self-portraits of Van Dyck. The facial features are more recognisable and the execution of the hair points irrefutably in the direction of Anthony Van Dyck as the author of this portrait."

In the 1950s synchrotron radiation was initially regarded as a nuisance because it drained energy from the first generation of particle accelerators then being constructed at places such as Cern, in Geneva.

Particle physicists wanted to use the machines to smash particles such as electrons together to offer insights into the constituents of matter.

However, they found that much of the energy intended to accelerate particles was con-

verted into intense x-rays. This wasted energy and meant the machines needed expensive radiation shielding.

Later, however, it was realised that synchrotron radiation was itself a powerful tool for studying the properties of matter.

Synchrotron radiation can also help conserve art, for example, in working out why some paints fade or change colour, eventually altering the look of a painting.

Van Gogh's work is prone to such change with a common problem being that his vivid yellows are turning brown.

Some of his best-known paintings, including *Bank of the Seine* and *View of Arles with Irises*, are being analysed at the European Synchrotron Radiation Facility (ESRF) in Grenoble, France, which is partly UK funded.

Ella Hendriks, senior conser-

vator at Amsterdam's Van Gogh Museum, said many more pictures were affected. "The synchrotron research had shown the likely cause was sulphur compounds in the paint. This is something that we couldn't have known without the synchrotron to look at a very fine detail of the paint surface."

Marine Cotte, head of x-ray imaging at the ESRF, said she was planning a study of paint chips taken from Van Gogh's *Sunflowers*.

"It will be bombarded with x-rays to study chrome yellow degradation further. It's the same paint as other Van Goghs, but for some reason different paintings are suffering different effects."

The value of such studies is being recognised by experts. Among the other artists whose works are being targeted is Caravaggio, the late-16th century

Italian artist whose works were extensively copied, leading modern art experts into disagreements about authenticity.

Janssens has already studied one painting, *Saint Francis in Meditation*, to try to pinpoint the unique elements of Caravaggio's painting style for comparison with others whose attribution to him is disputed.

Discovering a painting has been wrongly credited is not always a bad thing. When it was believed to be a Rubens, *The Young Anthony* was valued at £1m because Rubens produced many such portraits. A self-portrait by Van Dyck, however, is far rarer.

Walter Liedtke, curator of European paintings at the Metropolitan Museum of Art in New York, said: "A self-portrait is always a special thing — especially for Van Dyck. My guess is that its value would at least double."