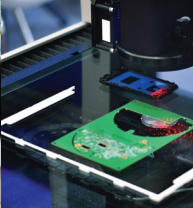


A vibrant X-ray image of a galaxy cluster, showing a complex structure of blue, green, and purple filaments and clouds of gas, set against a dark background filled with numerous bright yellow and white stars.

THE SCIENCE OF X-RAY technology

On July 23, 1999, NASA's Chandra X-ray Observatory, the most powerful X-ray telescope ever built, was launched into space. Since then, Chandra has made numerous amazing discoveries, giving us a view of the Universe that is largely hidden from view through telescopes that observe in other types of light.

The technology developed for X-ray astronomy has evolved at a rapid pace, and has, moreover, produced numerous spinoff applications used in security monitoring, medicine and biomedical research, materials processing, semi-conductor and microchip manufacturing, and more.



Examples include:

Airport Security

A system was developed that can simultaneously image, on two separate screens, materials of high atomic weight (e.g. metal hand guns) and materials of low atomic weight (e.g. plastic explosives) that pass through other systems undetected.

Medicine

The two major developments influenced by X-ray astronomy are the use of sensitive detectors to provide low dose but high-resolution images, and the linkage with digitizing and image processing systems.

Quality Control and Manufacturing

Combining advanced X-ray detectors with image displays has resulted in a number of systems that can be used to inspect the quality of goods being produced on a production line.

Biomedical Engineering

X-ray diffraction— a technique where X-ray light changes its direction by amounts dependent on the X-ray energy—is used in biomedical and pharmaceutical research to study complex molecular structures.