



Astronomy research

X-ray

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Thanks to those who always helped me achieve my goals

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Abstract

What is an X-ray?

What do you know about the first X-ray source discovered outside the solar system? ¹

What do you think is the feedback of these rays on each molecule?

How is X-ray obtained and what does it do for humanity?

By looking at the sky with X-ray and gamma-ray instruments, we collect important information in our attempt to address questions such as how the universe began and how it evolves, and gain some insight into its eventual fate. ²

Introduction

In 1927, E.O. Hulburt of the US Naval Research Laboratory and associates Gregory Breit and Merle A. Tuve of the Carnegie Institution of Washington explored the possibility of equipping Robert H. Goddard's rockets to explore the upper atmosphere.

In 1929 Hulburt proposed an experimental program in which a rocket might be instrumented to explore the upper atmosphere. This proposal included detection of ultraviolet radiation and X rays at high altitudes.

In the late 1930s, the presence of a very hot, tenuous gas surrounding the Sun was inferred indirectly from optical coronal lines of highly ionized species. The Sun has been known to be surrounded by a hot tenuous corona.

In the mid-1940s radio observations revealed a radio corona around the Sun.

The beginning of the search for X-ray sources from above the Earth's atmosphere was on August 5, 1948 12:07 GMT. A US Army (formerly German) V-2 rocket as part of Project Hermes was launched from White Sands Proving Grounds. The first solar X-rays were recorded by T. Burnight.³

The study of astronomical objects at the highest energies of X-rays and gamma rays began in the early 1960s. Before then, scientists knew only that the Sun was an intense source in these wavebands.

The first rocket flight to successfully detect a cosmic source of X-ray emission was launched in 1962 by a group at American Science and Engineering (AS&E). The team of scientists on this project included Riccardo Giacconi, Herbert Gursky, Frank Paolini, and Bruno Rossi. This rocket flight used a small X-ray detector, which found a very bright source they named Scorpius X-1, because it was the first X-ray source found in the constellation Scorpius.

In the 1970s, dedicated X-ray astronomy satellites, developed this field of science at an astounding pace. Scientists hypothesized that X-rays from stellar sources in our galaxy were primarily from a neutron star in a binary system with a normal star. In these "X-ray binaries," the X-rays originate from material traveling from the normal star to the neutron star in a process called accretion.

The study of X-ray astronomy continued to be carried out using data from a host of satellites that were active from the 1980s to the early 2000s: the BeppoSAX, which detected the first afterglow of a gamma-ray burst (GRB).²

Reports

X-rays (in French : Rayon X) or Roentgen rays (Röntgen radiation), a form of electromagnetic radiation with a wavelength of about 0.01 to 10 nanometers, equivalent to 30 peta Hz to 30 Agza Hz ($16 \cdot 10^3$ to $19 \cdot 10^3$ Hertz) and energy is between 100 electron volts to 100 kV. The X- ray wavelength is lower than the ultraviolet wavelength and higher than the gamma ray wavelength. ⁴

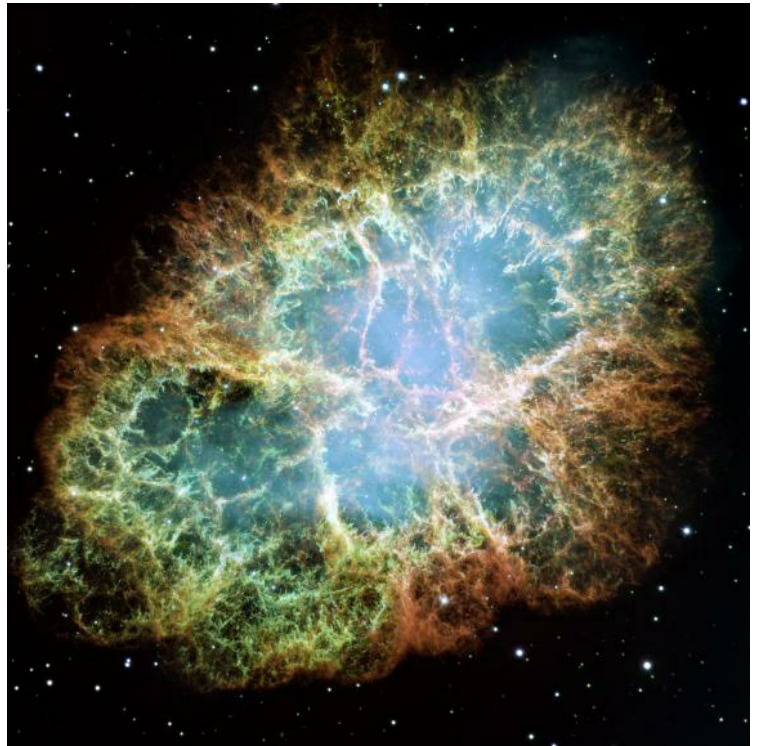
X-rays of superheated gases in supernova remnants or pairs of stars, one of which is a white dwarf or black holes, is obtained. Because X-rays pass through ordinary mirrors, their collecting telescopes use a set of focal and cylindrical mirrors that reflect the beam at acute angles. ¹

The Earth's atmosphere is opaque to X-rays. Therefore, to observe X-rays, detectors must be at the top of the atmosphere and must be carried there by rockets or artificial satellites. This unavoidable demand puts X-ray astronomy in a financial position that is different from other newly developed branches of astronomy. Spatial studies of X-rays are performed by satellites or rockets . Because the radiation of this ray can not pass through the Earth's atmosphere. ⁵

The first X-ray source to be discovered outside the solar system ¹

In 1956, Job and Friedman, in addition to achieving their goal of detecting solar flares as the cause of radio fading, made an important discovery similar to Karl Johnsky's discovery of radio waves . Wood and Friedman found that X-rays were scattered in several directions in which X-ray detectors were aimed. As a result, on the night of June 12, 1962. A rocket fired by researchers at an altitude of 230 km Two of the three X-ray counters installed in the rocket performed their automatic observation correctly in 350 seconds.

When the counters were turned directly south-southwest (geographically), a soft X-ray source with a power of about five quantum per square centimeter per second was found. This sign was much stronger than previously expected or hoped for. If the signal were from a nearby star, the star would have to emit X-rays with an output power of ten million times that of the Sun. The source was later when it was shown that in the direction of the constellation Scorpius , the scorpion 1-X was called.



The first X-ray galaxy ¹

The NRL group under Friedman undoubtedly created the first powerful X-ray galaxy in 1970. They discovered. It was M87, a galaxy with a special internal fountain. The fountain is a strong source of X-rays, but there is also a more important extended aura, which is very large. If visible (or even radio) light hits high-speed electrons, X-rays are produced. This process, known as the Compton process, is a major competitor to the emission mechanism of most powerful X-ray emission sources. These include X-rays from the circular path inside the Crab Nebula. The inversion of the Compton process takes place provided that low-frequency radiation is already present.

Examining the Yohoro artificial moon ¹

The Yohoro artificial moon (Swahili word meaning freedom) was one of NASA's small projects, but its scientific value was greater than most of NASA's large projects. Artificial moon on December 2, 1970. Launched, but its own design by ASE around 1964. They return. By Yvhvrv shipped devices to map the flux of X-ray sources with energies greater than 2×10^{-10} erg cm^{-2} in the sky were designed. The results of this study became known as the U3 list and were published.

Conclusion

Clusters of galaxies, most sources of X-rays ¹

Two theories have been proposed to explain the emission of X-rays from clusters of galaxies. One of them is the photo of the Compton process. Another theory that in 1971 m. By J. Gan and Jay. Goethe (J. Gunn, J. Gott) suggested that it goes back to the idea of particle collisions. The amount of intergalactic gas inside the clusters may be much larger than astronomers thought. Although in each volumetric element, the incidence of collisions should be small, the total may be significant for the entire volume, because the total volume of a cluster of galaxies is very large.

Outlook for discussion ¹

X-ray astronomy entered its golden phase when the X-ray study was completed. According to research articles published in astronomical journals, it is in this era and research is ongoing. In the future, we will face significant discoveries in X-ray astronomy.

Sources

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