Measuring space

How Astronomers measure space

There are ways of detecting matter out in space that can't be seen by us due to the human eye being unable to process it. We are able to detect objects by looking in a different vision (infrared) or detecting for radio waves or radiation that lead us to discovering something new about the universe.

Analysing light

It is easy for any person to look at the light of stars within our galaxy with the naked eye or a telescope. We can use devices to help us determine the temperature of a star by getting the exact colour. With spectroscopy astronomers can spread out the light into a spectrum of colours.

Using Infrared

Infrared picks up heat differences in space and allows astronomers to observe a much wider temperature range from -250 degrees to 3000 degrees.
Observing objects that are hard to spot with a telescope such as dust clouds are no difficulty with the use of infrared. Unfortunately the Earths atmosphere of carbon dioxide and water vapour absorb the infrared. Infrared covers a wider part of the electromagnetic spectrum than visible light. I t covers 700 nanometres to 1 millimetre., where the radio waves begin.

Radio waves

The use of detecting radio waves has allowed for many discoveries in the universe.
Astronomers can detect energetic objects and massive explosions that occurred recently.
For example: Supernova explosions, radiation from supermassive black holes and even the echoes of the big bang. Radio waves have the longest waves length of any of the electromagnetic spectrum, they cover wavelengths longer than 1 millimetre. The radio waves do suffer from radio pollution (use of satellite TV).

Ultraviolet Radiation

Astronomers use ultraviolet radiation to track down the hottest of stars. A star that has a temperature of 10 000 degrees shines very brightly at ultraviolet wavelengths. The ultraviolet radiation has shorter wavelengths than visible light. The ozone layer makes it difficult to measure ultraviolet radiation in space due to oxygen and nitrogen atoms at high altitudes preventing the ultraviolet radiation.
The telescopes must travel into space to measure the radiation.

X-rays wavelengths

The use of x-rays can show space as a large pool of glowing gas and strange fluctuating stars.
A powerful source of x-rays source is supernova remnants and black holes where the temperature reaches 100 million degrees. The x-rays are a very short wavelength with a high energy electromagnetic radiation. The wavelengths are between 0.01 and 10 nanometres, which is much shorter than the visible light.

Gamma-ray wavelengths

The gamma-rays can measure objects in space such as black holes, quasars and pulsars.
Gamma-rays have the shortest wavelength and the highest energy of the electromagnetic spectrum.
The gamma-rays are generated by radioactive atoms in space by colliding particles.
The wavelengths is between 0.0000000001 nanometre and 0.01 nanometre.