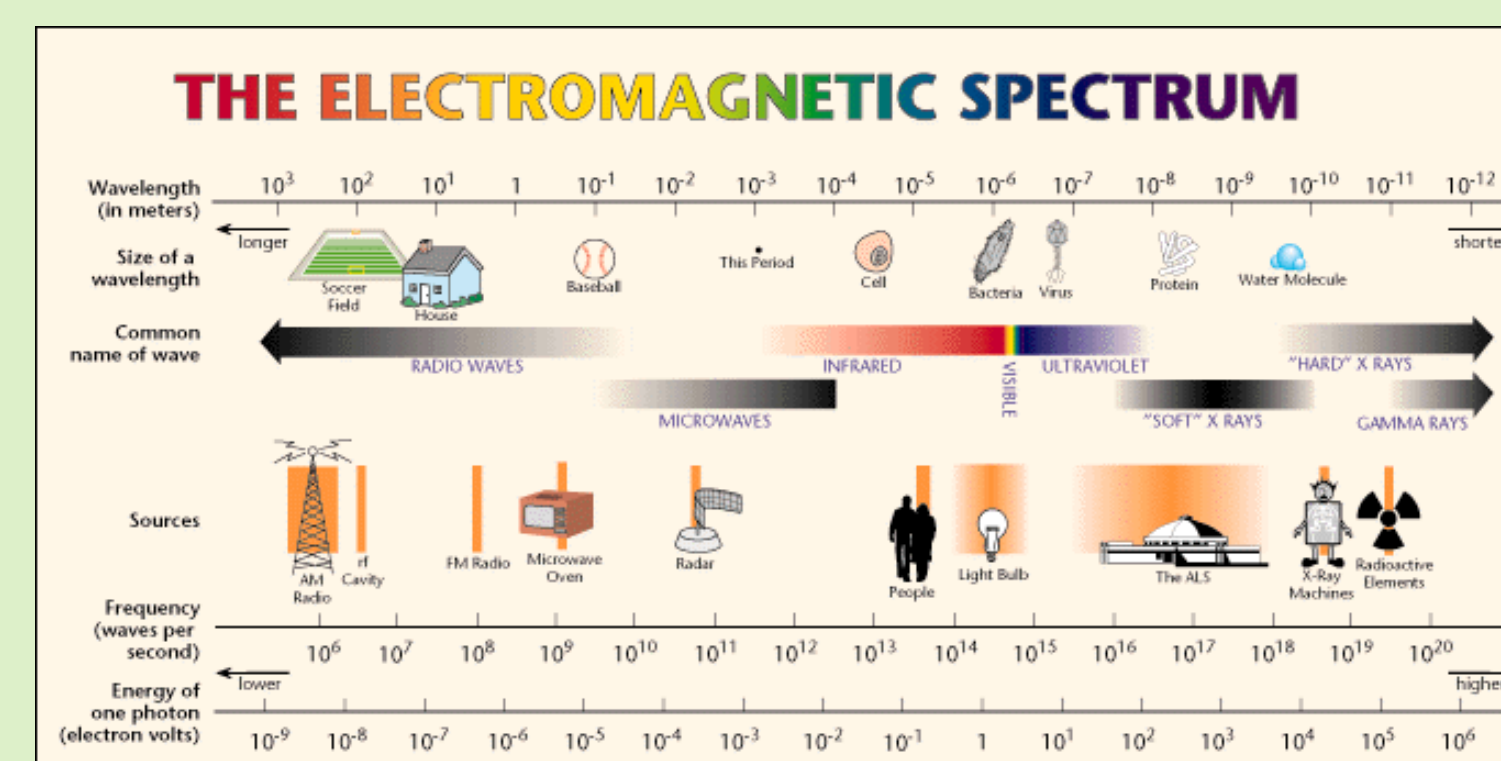
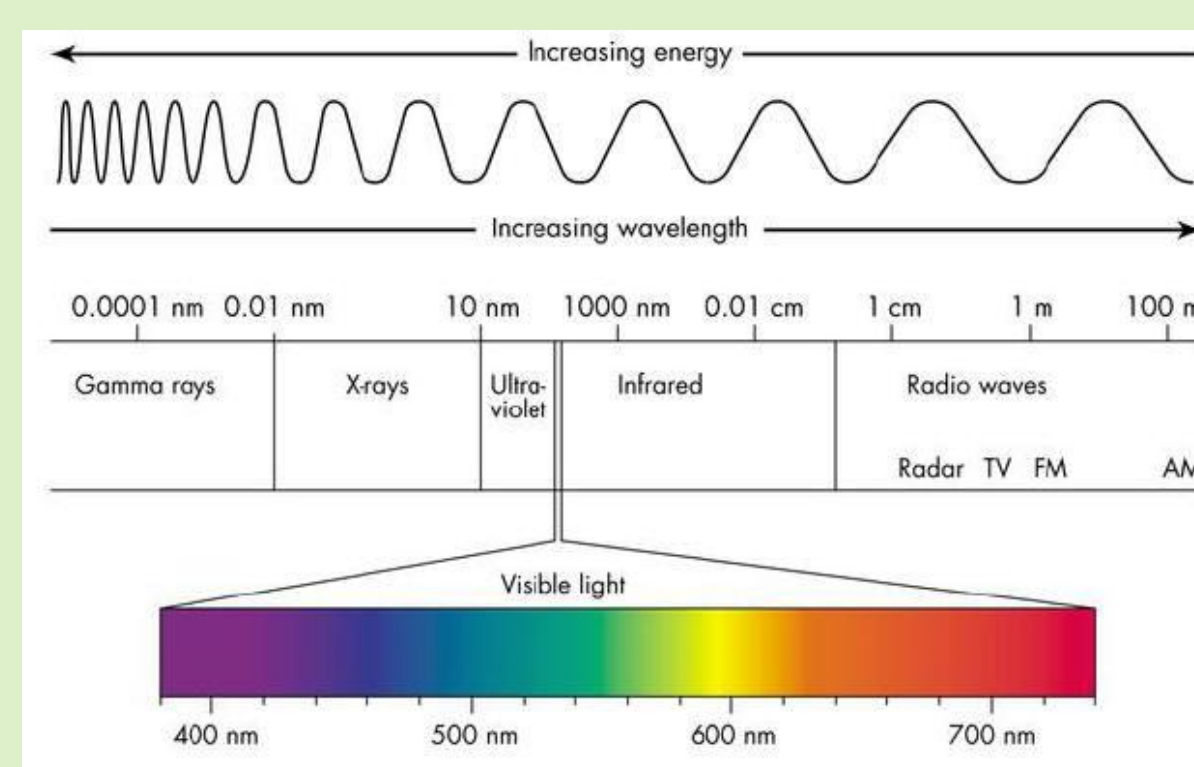


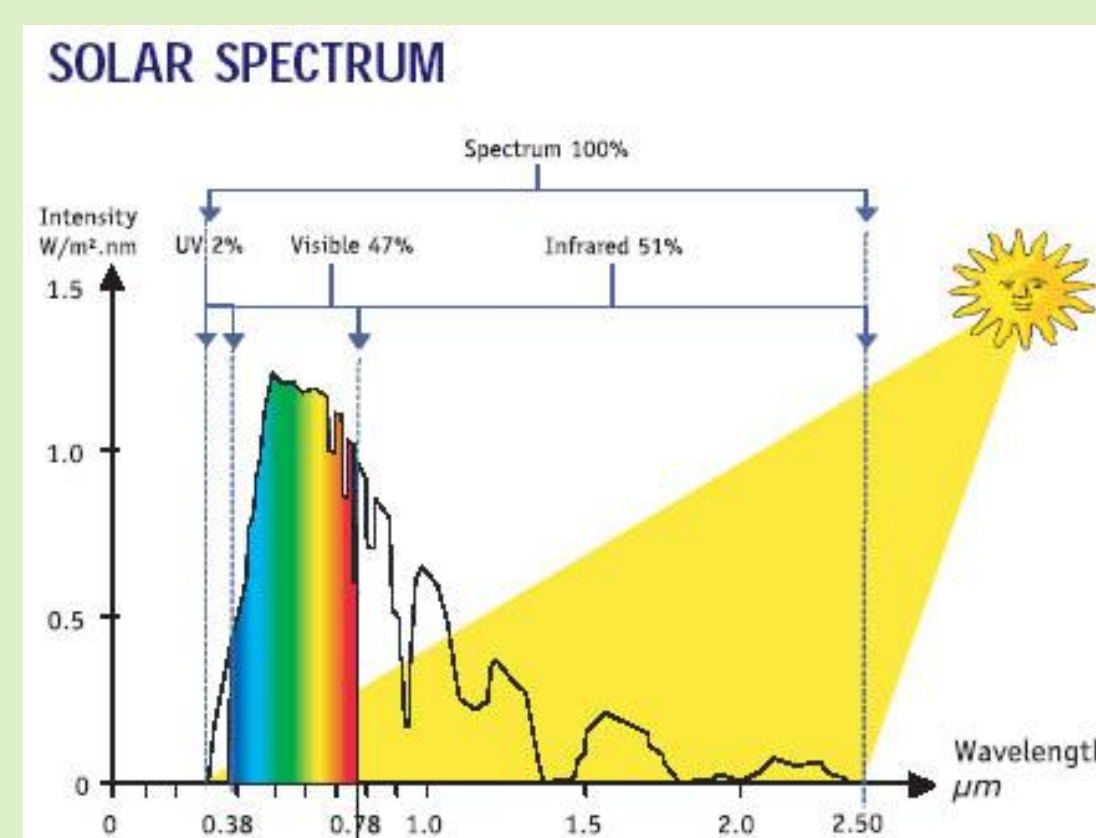
HERSCHEL EXPERIMENT AND INFRARED LIGHT

Electromagnetic Radiation and Light

Electromagnetic radiation is characterized by its wavelength (or frequency) and its intensity. When the wavelength is within the visible spectrum (the range of wavelengths humans can perceive, approximately from 390 nm to 750 nm), it is known as "visible light". Infrared light is electromagnetic radiation with a wavelength longer than that of visible light, and it's a type of light that we cannot see with our eyes.

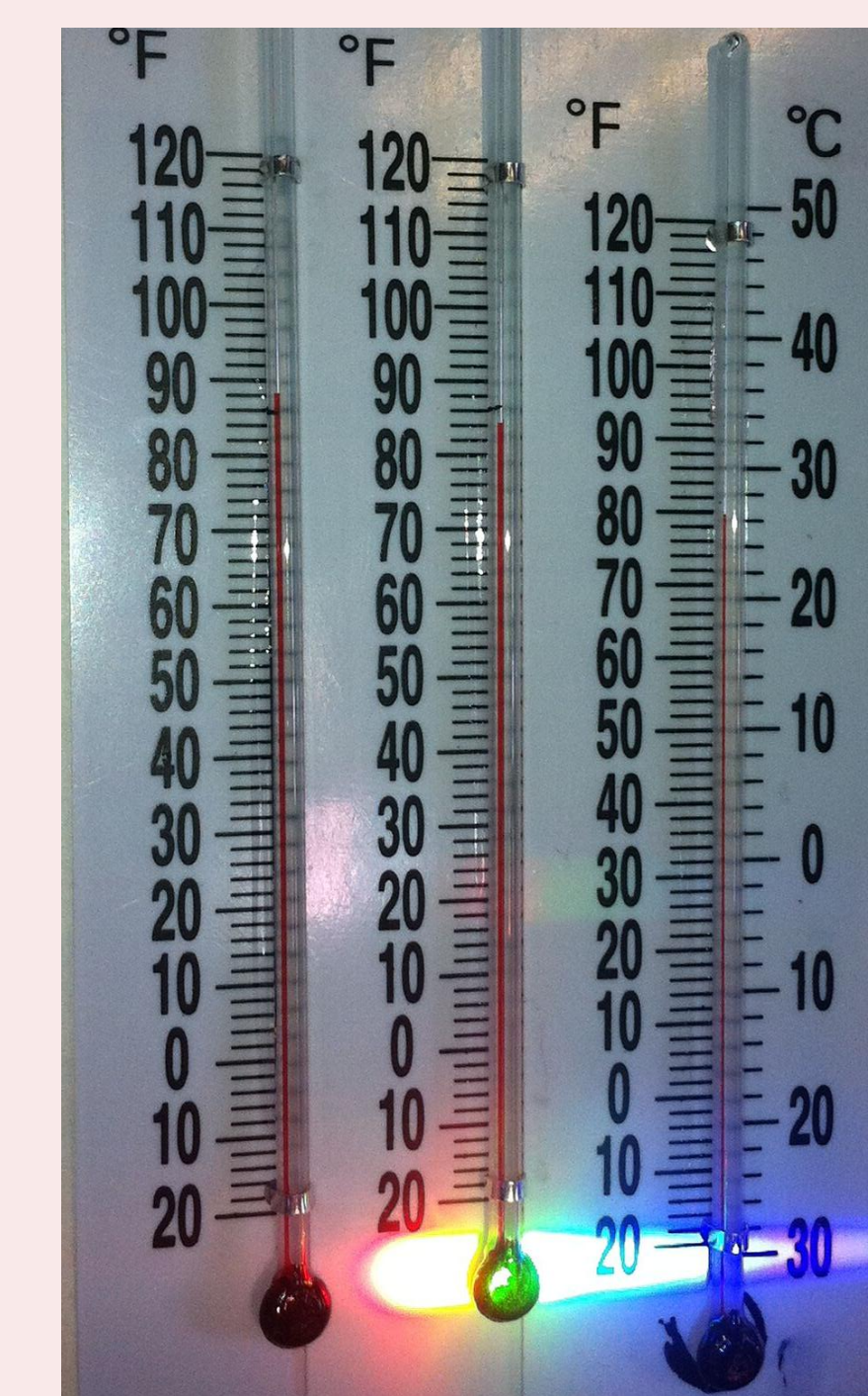
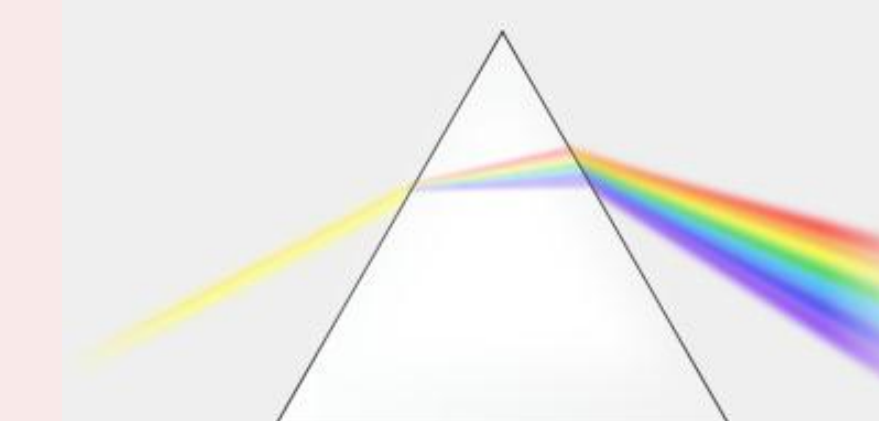
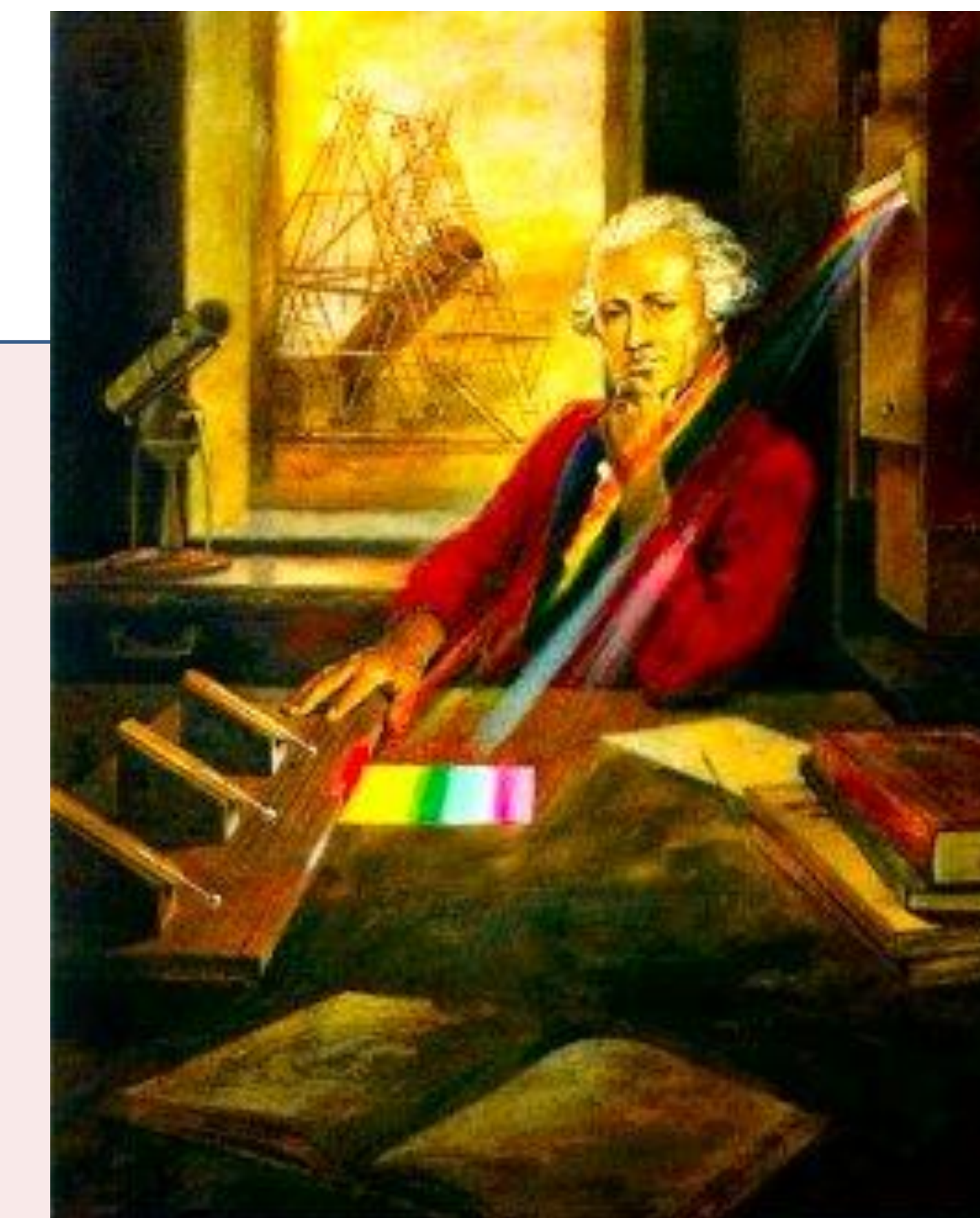


Sunlight, in the broad sense, is the total frequency spectrum of electromagnetic radiation given off by the Sun, particularly infrared, visible, and ultraviolet light. Much of the energy from the Sun arrives on Earth in the form of infrared radiation.



The discovery of infrared light

is attributed to William Herschel, who performed an experiment where he placed a thermometer in sunlight of different colors after it passed through a prism. As sunlight passed through the prism, it was dispersed into a rainbow of colors, a spectrum. Herschel was interested in measuring the amount of heat in each color and used thermometers with blackened bulbs to measure the various color temperatures. He noticed that the temperature increased from the blue to the red part of the visible spectrum. He then placed a thermometer just beyond the red part of the spectrum and found that the temperature was even higher. Herschel realized that there must be another type of light beyond the red, which we cannot see. This type of light became known as *infrared*. *Infra* is derived from the Latin work for "below".



Actually, Herschel was right but also wrong. That the temperature increase was highest at infrared wavelengths was due to the spectral index of the prism rather than properties of the Sun. The energy peak of the solar spectrum is at 0.60 micron (orange light), and definitely not in the infrared. But due to the fact that the index of refraction changes very little at the red end, the wavelengths there will be bunched up, more concentrated; thus he got the highest temperature at infrared wavelengths.

Infrared Astronomy



Fascinating, new discoveries are being made about our Universe in the field of *infrared astronomy*. The universe contains vast amounts of dust, and one way to peer into the obscured cocoons of star formation and into the hearts of *dusty galaxies* is with the penetrating eyes of infrared telescopes. Our universe is also expanding as a result of the Big Bang, and the visible light emitted by very distant objects has been *red-shifted* into the infrared portion of the electromagnetic spectrum.



Did You Know?

Herschel Space Observatory is a space based telescope that is studying the Universe by the light of the far-infrared and submillimeter portions of the spectrum. It was originally called Far Infrared and Submillimetre Telescope or FIRST and was renamed in honour of the pioneering astronomers William and Caroline Herschel. It was launched on 14 May 2009 by European Space Agency.

For more information about Herschel Experiment, please follow the QR Code:



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