Source : www.thehindu.com Date : 2022-04-23

SCIENCE FOR ALL

Relevant for: Science & Technology | Topic: Space Technology & related matters

Since a light year is defined as the distance travelled by light in one year, this would mean that we are seeing this star as it existed 12.8 billion years ago – just 0.9 billion years after the Big Bang. | Photo Credit: Getty Images

This article forms a part of The Hindu's Science for All newsletter, which explains all things Science, without the jargon. Subscribe here

Gravity is a force to reckon with. This is somewhat surprising given that it is one of the weaker forces in nature, if you consider the strength of the electromagnetic force, which acts between charged, magnetic particles like the electron, or the strong nuclear force, which acts between components of the atomic nucleus, such as the protons and neutrons. Because it depends on the mass of the object it can even tamper with fabric of space-time, and extremely massive objects can distort, or warp, the space-time around them.

Even light, despite being the fastest moving object in our universe, is diverted from its straight path when it passes near a massive object, like a very massive black hole. When we observe the light from a star that passes near an intervening galaxy, again it can get "lensed" – a term that implies that the gravity of the galaxy causes it to act like a lens and distort and magnify the light from the star. This can lead to various effects.

Firstly, gravitational lensing can magnify the image of the star as we see it. Secondly, if the star we are observing is exactly behind the intervening large galaxy, there are four images of the star produced around the galaxy's image – a phenomenon known as Einstein cross. If it is slightly away from the line joining us on earth and the galaxy, but behind the galaxy, the image we capture will be like an arc of light.

Recently, scientists imaged a star that is extremely far away, at a distance of about 12.8 billion light years away. Since a light year is defined as the distance travelled by light in one year, this would mean that we are seeing this star as it existed 12.8 billion years ago – just 0.9 billion years after the Big Bang. This is very exciting as, if confirmed, this would reveal to us the composition and nature of a class of stars that formed so early in the universe.

Scientists would not have been able to see this star if not for the fact that its light actually passed through a ripple of space time created by a galaxy that was intervening. This fortuitous positioning of the star is what, because of gravitational lensing, made it possible for scientists to observe it.

Gravitational lensing is key in discovering many celestial objects today.

(If this newsletter was forwarded to you, you can subscribe to get it directly here.)

Why cats and dogs are less susceptible to Omicron

Wavelike phase of electrons seen in fabricated device

A better millet for potential iron deficiency

Did humans inherit love of alcohol from primate ancestors? Read the answer here

Switch over to environment friendly methods of cremation: NGT tells States

New shrimp species discovered off Lakshadweep

Centre extends tenure of environmental clearances

Climbing mercury raises anxiety in farmers

Our code of editorial values

END