

# Space: The Reflection of Past

Himanshu Shekhar<sup>1\*</sup>, Subhro Sarkar<sup>2</sup>, Dibyanshu Shekhar<sup>3</sup>

<sup>1,3</sup>Scholar, Department of Computer Science and Engineering, Arya Institute of Engineering and Technology, Jaipur, India

<sup>2</sup>Scholar, Department of Mechanical Engineering, Arya Institute of Engineering and Technology, Jaipur, India

**Abstract:** In this paper we will discuss a phenomenon of space which is observed by us every night but still unknown to us. Every night we see stars in sky but still couple of facts which are not known to us. In this paper we will discuss the fact that every time we see space, we see past. Everything in sky no matter its day sky or night sky is a part of past not present. We can even conclude that sky is a mirror for past.

**Keywords:** Luminous object, Hubble telescope, Doppler effect.

## 1. Introduction

Space is something that seems to be infinite and by Doppler Effect we can observe that space is expanding. So, I was observing the silent and beautiful space and I realized that I was looking into the past of the space. Most of the things we see in space are there past.

And so, if a star, far from the earth gets destroyed, we will not even know as we will be seeing its past. That star is no more there but we will still see it there. Since light coming from it takes time to reach us, so the light which was emitted by its years ago is seen by us today, so we see an image of it, where we find that it is still there.

## 2. How We See Things in Space

As we know that light first falls on the object and then come to our eyes and then we are able to see that object in case of non-luminous object and in case of luminous object, the light directly come from the luminous object to our eyes and we can see that object. So, if we compare it to something like star that is a luminous object, so we are able to see the star due to light coming from it.

## 3. Mathematical View

How we see an object from earth that is far from us in space?

Let galaxy MACS0647-JD be galaxy x and we observe galaxy x from Hubble telescope. So, the light ray shown in the form of arrow comes from galaxy x to the Hubble telescope and the Hubble telescope creates an image of galaxy x and sends it to earth. So, as we know that galaxy x is approximately 13.3 billion light years ago (source: space.com) from us. So light from galaxy x takes 13.3 billion years to come to earth, which means that the light ray that was long ago emitted is used by us to form its image, so whatever imagine it's forming in Hubble telescope of the galaxy x, that we are seeing, it is how it looked

years ago, but we don't know how it looks today and we will get to know that in future after billions of years.

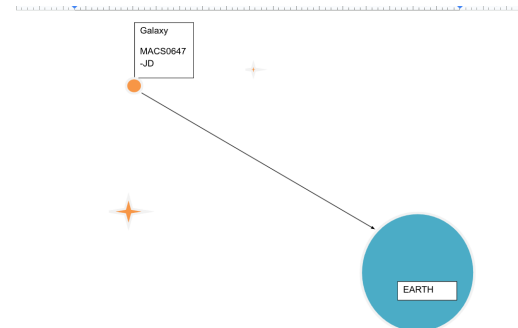


Fig. 1.

Now let us assume a case where galaxy x got destroyed previous year, but we will not know that till time t, where t is,  $t > 13.3$  billion years (since space is expanding)

So, we will keep seeing the past of that galaxy, where as in real time that galaxy no more in existence.



Fig. 2. MACS0647-JD galaxy (Source: space.com)

## 4. We Don't See the Present of Sun

We it comes to sun, an object that we see every day, it's little surprising to know that we are not even seeing it's present instead we are seeing its past. So what time difference is in the sun's past and present when viewed from earth?

\*Corresponding author: himanshushekhar39@gmail.com

Let's take,

$X$  = distance between sun and earth = 149.6 million km.

$Y$  = speed of light = 299792458 m/s.

$Z$  = Time taken by light to travel to earth.

$Z = x/y$ .

$Z = 499.011886$  sec.

So, we see the past of the sun from earth and the difference between sun's past and present is 499.011886 sec.

### 5. Universal Formula to Calculate How Much Back into Time, Are You Looking When Observing an Object

$X$  = distance of the object from the device or in case of eyes, distance from the eyes.

*Time difference:*

$Z = X/Y$ .

So here  $z$  will give you how past in time you are looking while observing that object.

### 6. Conclusion

Every object that we see, that is  $x$  distance away from our eyes or the device, we are using to see. We are unable to see the

present of the object instead we are seeing its past.

$x >$  speed of light

Now when it we talk about object that is inside our solar system, this is not a big problem but when we are talking about galaxy that is billions of light years ago, then it is really a problem as we might never know if the object that we are seeing no longer exist, instead was destroyed years ago.

So next time you use your telescope to look out in space, remember you are looking at the past, not the present.

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