Object moving towards the observer might appear to have infinite velocity and hit without giving any warning.

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Abstract:

The apparent velocity of an object moving towards or away from the observer will be different from its actual velocity. To get the apparent velocity, actual velocity will have to be multiplied by a factor called scale factor. For an object moving away from an observer at considerable speed compared to that of light, scale factor is given by**1/1+z,** where z = v/c, v= velocity of the moving object and c = velocity of light in vacuum. So, apparent velocity = **Actual velocity/(1+z)**.But when the object is moving towards an observer, it appears to move *faster than actual velocity*. This is because **Scale factor for objects approaching the observer=1/ (1-z).** Most important thing is that the velocity of the object appears to be **faster than the velocity of light** in vacuum, for all values of **z > 0.5**.Also, it appears to be approaching at infinite speed for z =1.

1. Objects which are moving away.

The apparent velocity of an object away from the observer will be different from its actual velocity**.** It appears to be moving **slower** than actual velocity. The concept is explained in ref [1],[2],[3],[4].

2. Objects which are moving towards the observer.

But when the object is moving towards an observer, the situation is different. The events appear to happen *faster than actual velocity*. Most important thing is that the velocity of the object appears to be **faster than the velocity of light** in vacuum, for all values of **z > 0.5**.This is because **Scale factor for objects approaching the observer=1/ (1-z).**

3. Illustration of an approaching object.

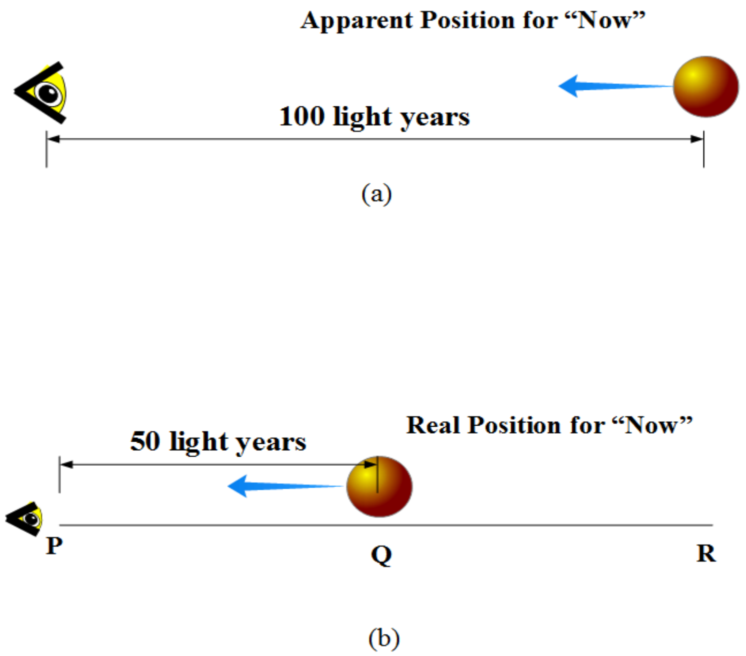

Figure-1

Let us consider an object moving towards an observer at 0.5c. Let it be at 100 light years away and let us assume it to be emitting light, as shown in figure-1. It takes 100 years for the light to reach the observer. Let us assume that the observer sees it just "**now**". By the time the light reaches the observer from that position, that is "**now**", the object will be at 50 light years away, because it is approaching at **0.5c** and during 100 years, it will travel **0.5cX100 = 50** light years distance. So, it appears to be at 100 light years when it is actually at 50 light years away.

Light from its present position reaches after 50 years from now and so after 50 years, it appear to be at 50 light years away but it will be actually at 25 light years away. Most important point is that the *observer who finds it at 100 light years away will see it at 50 light years, after 50 yrs.* That means **it appears to have traveled 50 light years of distance in 50 years**. So, it appears to be moving at the **velocity of light** for him. It will hit the observer after another 50 years,that is exactly 100 years after he saw it to be at 100 light years away.

Explanation:The scale factor approaching object= **1/ (1-z) = 1/ (1-0.5)= 1/0.5 =2.**

The equation for apparent velocity = **Actual velocity X scale factor = z/ (1-z),**

So, apparent velocity =2X actual velocity= **2X0.5c= c.**

Hence it appears to be approaching at the velocity of light.

4. **Apparent velocity faster than light!**

If the object is moving at **z > 0.5**, then it appears to be approaching faster than the speed of light.[5]

4.1 Example.

For an approaching object, let **z** be equal to **0.99c**.

For **z=0.99c**,the scale factor = **1/(1-0.99)=100**.

So, apparent velocity = **z/(1-z) = 0.99c/(1-0.99)=99c.**

It appears to be moving at **99 times the speed of light!**

Figure-2 shows the variation of apparent velocity of object approaching towards the observer. It starts from zero for z=0 to infinity at z=1. That means, if it is approaching at the speed of light, then **z=1 and so, it appears to be coming at infinite speed!** Such an object *appears to come and hit us instantaneously*, without giving any warning!

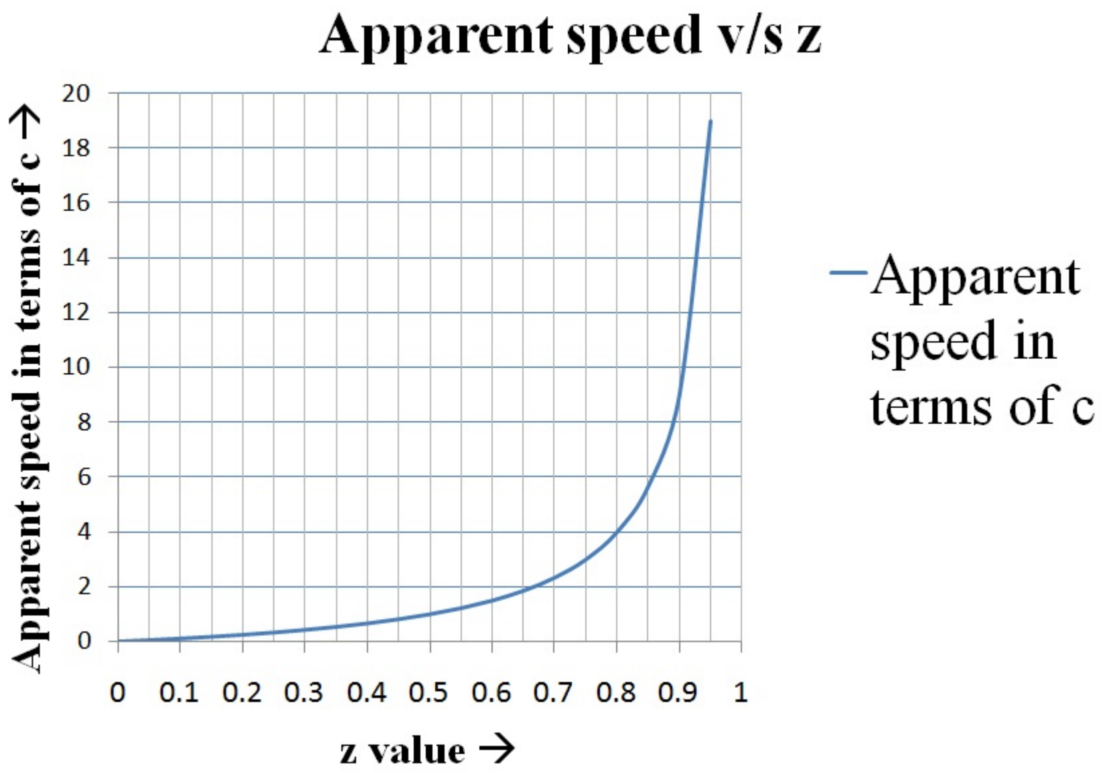

Figure-2

But we get some fundamental questions. These are:

Q1] We are seeing GNz11 at 13.4 billion light years away. Then how can this come?

Explanation: Actually we are not seeing it. We are seeing the light emitted fromGNz11 13.4 billion years ago!. Now, Gnz11 might not be there at all!

Q2]What about the Sun? We are seeing it on a bright Sunny day.

Explanation: We are not actually seeing the Sun. We are seeing the light emitted by the Sun about 8 minutes ago.

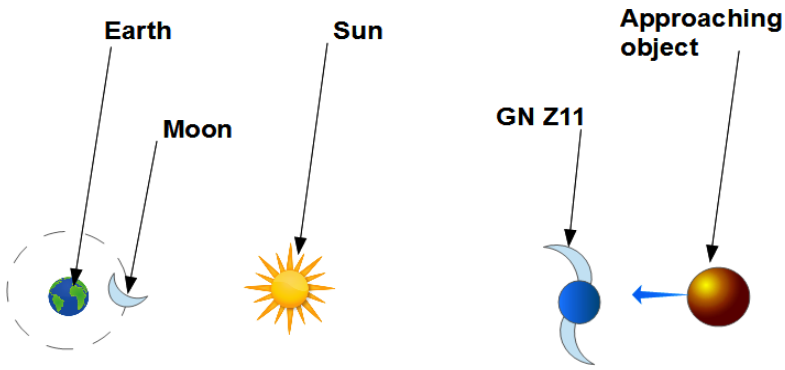

Figure-3

Only thing is that such an object, if it is coming in that path along GNz11 and if Sun , Moon and Earth are in line as in figure 3, then the object will first engulf GNz11, then parts of Milky way, then the Sun, moon and finally the Earth along with the observer!

References :

[1] Relativistic time correction on movement of distant galaxies makes the present age of the universe as 28.2 billion years by Jayaram A. S. **IJIFR/V4/ E2/ 048 or** http://vixra.org/abs/1611.0197

[2] Cosmic scale factor http://timtrott.co.uk/scale-factor/

[3] Scale factor in astronomy http://www.astronomy.ohio-state.edu/~ryden/ast143/Oct_28.pdf

[4] Scale factor(cosmology) https://en.wikipedia.org/wiki/Scale_factor_(cosmology)

[5] Superluminal motion. https://en.wikipedia.org/wiki/Superluminal_motion