

I have 3 questions that I am struggling with regarding the age and visibility of objects in the universe.

Question 1

The universe is approximately 14bn years old and it is accepted that it started with the “big bang” a singularity from which space expanded to form what is the current universe and it is still expanding.

We have what is referred to as the observable universe in which the light from the most distant objects has travelled approx. 14bn years to reach us.

Ignoring the first portion of time when we don't actually understand what happened, these objects must have been around 14bn years ago for their light to have started to travel towards us.

But. 14bn years ago the universe had only just started expanding and everything was close to everything else. Therefore we must have been fairly close (relatively) to those now distant objects and would have seen them immediately as their light didn't have to travel for 14bn years to reach us.

If their light started to travel towards us 14bn years ago then that object must have been present 14bn years ago but we know it wasn't because matter was still forming.

So how are objects 14bn light years away visible when they didn't exist?

If we say that the object was formed sometime after the universe started expanding, let's say 13bn years ago. The source of that light was, at that time only 1bn light years from us so why do we think we can see it now 13bn years old? We would have seen it after only 1bn years.

Question 2

If the space time itself is expanding (not from a central point) and everything is moving away from everything else. Then we look at an object where light has taken 14bn years to reach us but it must also be looking at light 14bn years beyond that and again the object that it can see will also be able to see something 14bn years from it.

Is this what we mean by observable universe? And will we ever be able to see those further objects? If not, why is the limit of what we will ever be able to see 14bn years?

Question 3

This is somewhat linked to Q2

There is a belief that the universe is expanding ever faster and there will come a time when the light from a distant object will never reach us. This implies that there will come a point where objects are moving away from each other faster than the speed of light. How is this possible.