

Are We at the Center of the Universe?

By Clark M. Thomas

One of the ways those who are "in" with Relativity show their superior wisdom over those who are not yet so enlightened is to explain how everybody is apparently at the center of the Universe.

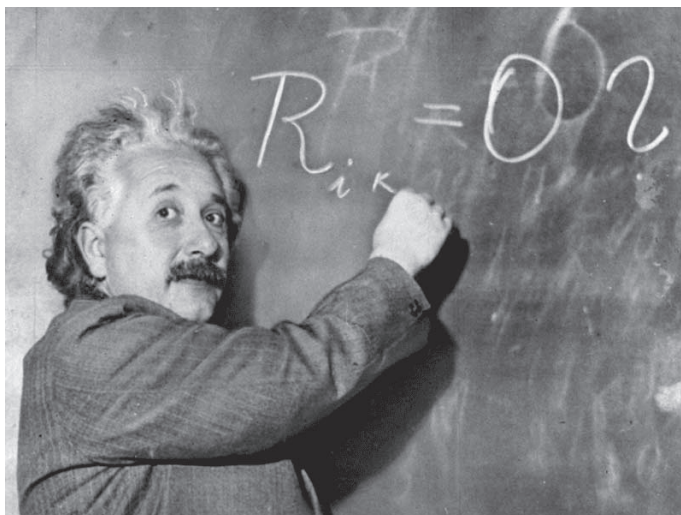
There are two visual aids used to demonstrate this fact: the baking raisin loaf, and any line of galaxies. Both are correct, but only within limits.

The loaf of bread that contains many raisins expands as it bakes. Every raisin that was together in the beginning thinks they alone are at the center, when no raisin really is.

Any one straight line of galaxies represents a large number of lines that could be drawn in all directions from any reference point in space. For simplicity, one line of galaxies features expansion, with each galaxy's residents feeling they are stationary, while all others are receding. Indeed, if we feel we are stationary, other galaxy residents in deep space can look at our galaxy and feel the same about themselves as we recede from them. These are all relative perspectives.

Be it galaxies or raisins, the idea goes back to the brief period of inflation shortly after the local big bang. During inflation our tiny universe expanded very rapidly, only to slow down for a few billion years, and then about five billion years before our present era start to accelerate expansion again. In other words,

the first inflationary geometry was set off by the colossal bang itself; followed by an expansion era where Dark Energy and Dark Matter were similar in strength; and then followed by Dark Energy assuming an increasingly greater dominance.



Within the current idea of one universe the gravitational force of Dark Matter and the expansive force of Dark Energy almost canceled each other's effects for several billion years. However, Einstein's anti-implosion fudge factor is Dark Energy, which gathers strength as time/distance passes.

Some would say that the known universe will eventually expand into an ethereal vastness, followed by eventual chaos as entropy (chaos) triumphs over negentropy (order) many billions of years hence. This is a logical consequence of accelerating Dark Energy within a unitary Universe.

This vision is compelling, but likely very wrong. For example, looking again at the expanding raisin bread loaf, it is true that each raisin sees others expanding from itself, creating the illusion of being at the center of the loaf. However – and this is very important – that raisin loaf in the whole does indeed have an external shell or boundary, much like the objective "shell" of the expanding universe. At the objective boundary raisins can look in many directions to see other raisins receding, but they cannot look outward beyond the shell to see any more raisins at all.

You could argue that the relative boundary we are seeing is Hubble's radius. In Hubble's horizon model we are inside an increasingly expanding universal horizon. This boundary is a function of the observer's position. In contrast, black hole event horizons are small and fairly fixed in size, where even light does not escape.

Universal space itself appears to be expanding under the force of increasing Dark Energy, to where distant galaxies appear to be approaching the speed of light (relative to us) as they accelerate beyond our Hubble radius. This is fine, but eventually a real radius beyond our apparent Hubble radius exists, as determined by the history of our big bang.

Just inside the objective expanding boundary of our big bang universe anything nearby would not appear to be accelerating fast at all — even if they could appear to be accelerating near the speed of light relative to another perspective deeper within the known universe.

Of course, this reality does not exclude approaching objects produced by an adjacent universe. Approaching objects moving apparently slower than the speed of light at our universe's objective border would exhibit a blue shift, whereas objects within our universe would shift red.

This blue shift phenomenon is a window for discovery. With the right instruments we could penetrate the red-shifted Cosmic Microwave

Background, and then see elements with blue shifts beyond.

Consider any line of galaxies within our expanding known universe. That line does not extend outward infinitely in all directions, just as it does not extend inward infinitely. All but the last galaxies toward either end of the line can see others receding, helping them feel like they are at the center. However, within the limits of detectability, when you are approaching the outward "end of the line" you will be able to see more movement in one direction than in the other direction. At the outward end of the line you will be like a raisin on the real surface of the loaf of bread.

It is possible to contend that the total Universe goes infinitely in all directions, and that model is intellectually compelling. However, the unitary Big Bang idea has only one Universe, whereas a multiverse may extend infinitely, but only within a "bubble soup" of many individual big-bang universes, of which ours is but one.



Even if there is but one Universe, and beyond our big bang there is nothing organized that we can detect, then there will be a historical "end of the line" for galaxies created by baryonic matter which emerged several million Earth years after the big bang.

In other words, from a raisin-loaf perspective, our detectable universe would end, even if the Universe beyond our local big bang universe did not.