Ask A Genius 32 - Informational Cosmology 8

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December 10, 2016

Scott: Are most photons not captured by other things in the universe? They traverse, lose energy.

Rick: The craziest statistics that nobody knows. There's many of them, but one of them is that only one trillionth of the night sky is covered by stars. That means if you shot a photon into empty space, then you would need to shoot a trillion of them to have a good chance of hitting a star. Most sight lines in space don't end up at a star. We can talk about Olbers' Paradox. We don't have time to talk about that.

It is like standing out in the middle of a forest, but only having a trillionth of your sightline has a tree in it. If you shoot a trillion bullets and only hit one tree, then those trees are fairly sparse. It is the same with space and photons.

Most photons are not intercepted within a couple billion or ten billion, or the vast percent, of photons don't run into matter within the first ten billion light years of their travels. There are certain caveats.

We are in a Solar System, where we have the star that takes up a huge amount of the sky relative to the amount of the sky that stars usually take up. Still, even in daylight, if you're looking around and in the orbit looking at the Sun, the Sun doesn't even add a percent of the sky covered.

So, yea, most photons get away. They go, and go, and go, and go. We can probably assume that they eventually run into something, but I'm not sure that's a necessary assumption. It rests on the curvature of the universe, where as the photon zips across everything.

We've got this theory where T=0 is spatially different from where we're at. So, things are going to be more compactified in an actual future as opposed to the past of a big bang. Things start getting mushed together in a T=0 area. So, a lot of photons will be captured.

What you can say whether you believe in a T=0 with the rest of the universe, most photons get loose. They keep going. They get redder and redder. Their wavelength gets longer and longer as they traverse space that is large enough to be subject to the Hubble Constant, which Big Banger says is velocital.

But if you believe the universe is informational, you can say it is gravitational or structural. In an case, photons lose energy. It is that loss of energy that makes the increase in order possible and helps breed large-scale order. Order on the scale of galaxies and all of that stuff and actually helps determine the Arrow of Time

Scott: IC in that framework has two separate theories. Two distinct from standard Big Bang cosmology. One, where T=0 is apparent T=0, large collections of matter functioning as storage. Where time is virtually frozen, that would be global negentropy. Two, we have global entropy, but localized negentropy with the shedding of waste heat in persistent structures like solar systems.

Rick: If you can segregate information that is not actively being used, if you can store it around T=0, that is a nice sink. I don't know exactly how it works, but it is part of a system that is negentropic.

Scott: In general, that would be storage. That storage would be subject, like all storage systems, to information decay, but over extraordinarily deep cosmic time.

Rick: In the cosmology that we've been poking at, we live in an information space. It is not our information. It is information that is the universe. You've got storage, but it is information that is supported by an armature that is a material support frame like a hard drive or a CPU some place in a universe not our own – like the brain. Some place that can store information because information can't store itself.

The information we have in our brains. That information can't store itself. It is stored in our brains. The information in computers is stored within computers. Information stored within the universe, if it is made of information, is stored someplace else.

The material thing that supports our information universe is, we can assume, subject to having stuff happen to it. Stuff happen to our brain. Stuff happens to our computers. Information is lost when the system brains, whether permanently ot temporarily.

With us, our information is way, way lost when we get Alzheimer's or die. In the case of a computer hard drive, it depends on what is going on. It is based on information. In decay that is based on information, that decay that can be both within the information as information contradicts itself and you have to rejigger everything as new information comes in.

But more importantly, information can decay because the vessel for that information is subject to decay. That looks like the heating up of the universe. A negentropic universe goes from tiny and hot to cool – to 3.7 degrees above absolute zero. That being the average temperature of interstellar or intergalactic space.

That 2.7 degrees being the temperature of the background radiation. But if you want to erase information, you raise the temperature. Things get hotter. Information contained in the universe is contained in spatial segregation and clustering. Things join up.

Subatomic particles join up. Atoms join up. On a planet and star, individual atoms form planets, to form stars, which are part of solar systems, which are part of galaxies, which are part of superclusters and filaments.

The universe is a bunch of matter that is collapsed via us being closely associated with other matter. The universe is a bunch of clumps of matter at various scales. If you want to get rid of the information that is contained in the clumping, you heat up the universe. Things start breaking apart and the Planck wavelengths probably get longer and things get fuzzier, and you start losing the empty space between things.

At the point where all information is gone, all things are back to a hot, fuzzy mess with everything overlapping everything else, but nothing has a distinct existence and has the look of a Big Bang proto-atom or proto-whatever it is. A big, tiny, fuzzy point, that can be seen as a fuzzy point out of which everything, if conditions were right, could spring.