Questions for an Astrophysicist v2.0

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Feb 6, 2009

Questions

Dear Reader,

What is presented in the following pages is a series of questions steaming from a train of thought and as such many of the early questions provide a framework for thinking about the later questions.

I would like to ask that the entire presentation be read before trying to answer any of these questions as each reader will find a unique set of them far more interesting then the other ones depending on their area of expertise.

Thank you,

Emil DeVries

Spacecraft with v >= c

- No spacecraft can reach a velocity of the speed of light because as it accelerates its mass is increased as per:

  $$M' = M / \sqrt{(1 - (v^2 / c^2))}$$

  Thus as v increases so does M' and so does the amount of force needed to accelerate further. As the craft approaches c, M' approaches ∞ thus the craft can never produce enough force for its v >= c. ?

Spacecraft with v = ½c

- What of a spacecraft reaching ½c?
- Its mass would have only increased by ~15% due to high velocity.

$$M' = M / \sqrt{(1 - (v^2 / c^2))}$$

M=1, v=½c = $1.5E^8$ m/s, c = $3.0E^8$ m/s

$$M' = 1 / \sqrt{(1 - ({1.5E^8}^2 / {3.0E^8}^2))}$$
$$M' = 1 / \sqrt{(1 - (2.25E^{16} / 9.0E^{16}))}$$
$$M' = 1 / \sqrt{(1 - 0.25)}$$
$$M' = 1 / \sqrt{0.75}$$
$$M' = 1.15$$

- Considering that > 90% of a spacecraft's mass at launch is propellant and that mass is expelled at a much greater rate then velocity increases the total system mass, shouldn't it then be possible (though not cheap or practical) for a small payload spacecraft, launched from orbit, to reach a velocity of ½c ?
- A Saturn V, with 100kg payload, assembled, fueled, and launched from Earth orbit would reach a max velocity of?

Spacecraft with v = ½c phones home

- A spacecraft traveling at ½c wants to communicate with the earth via an onboard, high power, near UV, laser emitting 400nm ($7.5E^{14}$ Hz) photons (light) in dots and dashes.
- When the signal is detected on earth it will have been red-shifted due to the high velocity of the craft as per:

$$f_o = \sqrt{(1-v/c)/(1+v/c)} \bullet f_e$$

$v=½c$, $f_e = 7.5E^{14}$ Hz gives

$$f_o = \sqrt{(1-½)/(1+½)} \bullet f_e$$

$$f_o = \sqrt{(½/1½)} \bullet f_e$$

$$f_o = \sqrt{⅓} \bullet f_e$$

$$f_o = 0.577 \bullet f_e$$

$$f_o = 4.33E^{14} \text{ Hz} \sim 693\text{nm}$$

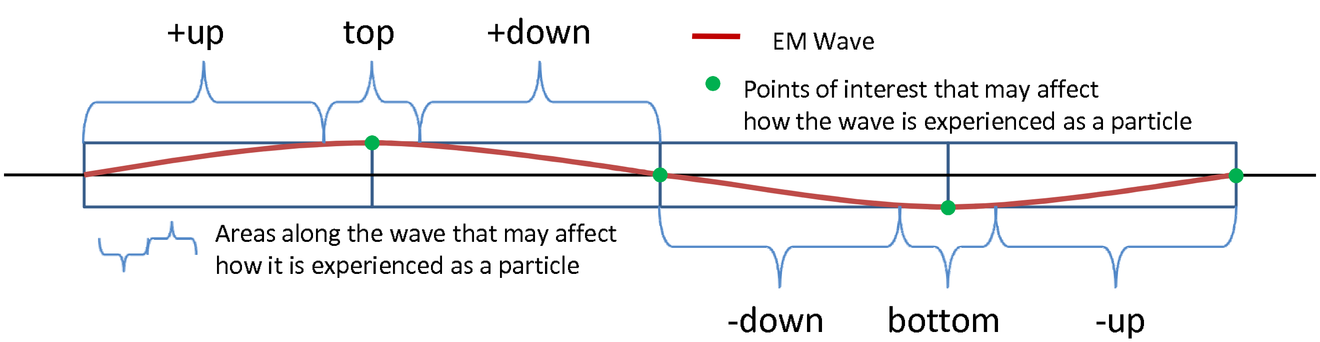
- A shift from the upper end of Violet to visible Red.
- A similar 400nm signal sent from earth would also be received by the spacecraft as visible Red thus could be some two way communications?

Dual Spacecrafts with v=½c

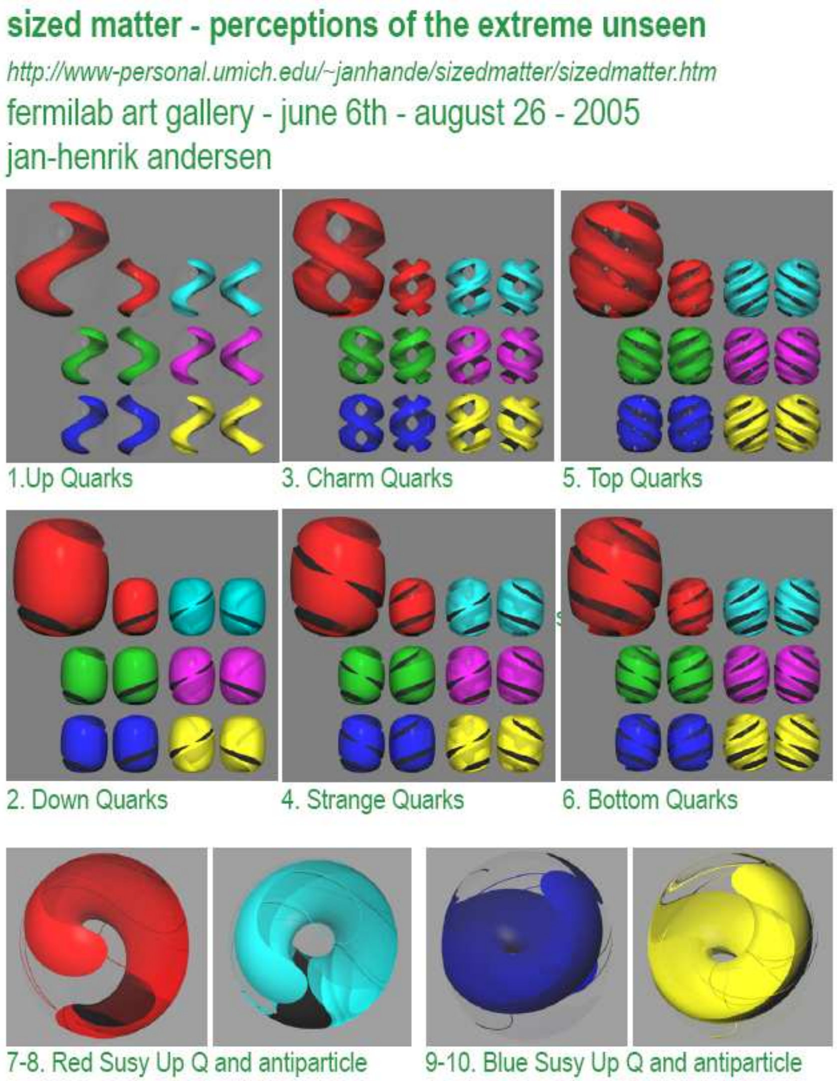
- Not to be outdone, our rivals launch two spacecrafts capable of v=½c.
- Both crafts build up speed and pass each other at v=½c as one goes up and the other goes down relative to the earth's orbital plane about the sun.
- Both are able to communicate with the earth via red-shifted signals but not directly with each other since from each spacecraft's perspective the other is traveling away from it at the speed of light.
- If only one spacecraft goes slightly more then ½c then they vanish from each other's realm of current experience into the other's past. Receiving the past transmissions, red-shifted, in reverse order, from the opposite direction?
- While each craft has vanished from the other's direct experience, craft A can still communicate with craft B using the earth as a rely station to convert the red-shifted signal received from craft A to a UV signal that is then transmitted to and received red-shifted by craft B?
- Is there a naturally occurring phenomenon (gravitational lens like) that could convert a red-shifted signal up to a UV signal and retransmit it such that said signal could be detected by a planet that is otherwise outside our current experience? Is there a way for us to detect such a signal if someone out there is sending one to us? If we could detect such a signal where would be a good place to start looking for it?

When Δv = c

- When the spacecraft's Δv = c the UV signal is red-shifted to the point of having f=0. How would the photons of this signal be experienced by the receiving spacecraft?
- The photon is still traveling at c as it passes the receiver but with f=0 it is not experienced as EM energy (E=hf, if f=0 then E=0). It has an infinite wavelength in a discrete quanta so could it be described as energy entering a tiny singularity only to come out the other side in it's own past as it entered the singularity? If it is not EM energy then is it experienced as a particle traveling at c?
- If so, what kind of particle (electron, quark, unitary boson)? The amount of transmitted energy would have a primary affect on what the something particle appears to be but would its position along its wavelength when experienced also have an effect even though it still contains a full wavelength?
- Slightly before Δv = c and f=0 there will be a point where f=1 and thus the signal would have a 300,000,000m wavelength. When f=0 is reached the particle could be experienced anywhere along it's wavelength thus it could have been rising above baseline, along the top, falling down to the baseline, falling below the baseline, along the bottom, or rising from below the baseline.
- Would this appear to be the same particle with different flavors? Could there be additional flavors due to detecting the particle at other critical points along the wavelength such as the very brief moments where the particle is exactly at top, bottom, and baseline crossings?



When Δv = c



Considering the visual description of quarks and other sub-atomic particles by Fermilab this kind of photon-to-particle transformation appears to be possible.

Charm and Top Quarks being higher energy (>f) versions of an Up quark with the waveform folded onto itself two and three times? The Blue Susy Up Quark being just a Blue Up quark detected at a different angle? Left and right quarks being identical with the difference being a function of the detector's orientation to the source?

When v = c

In open space with the photons

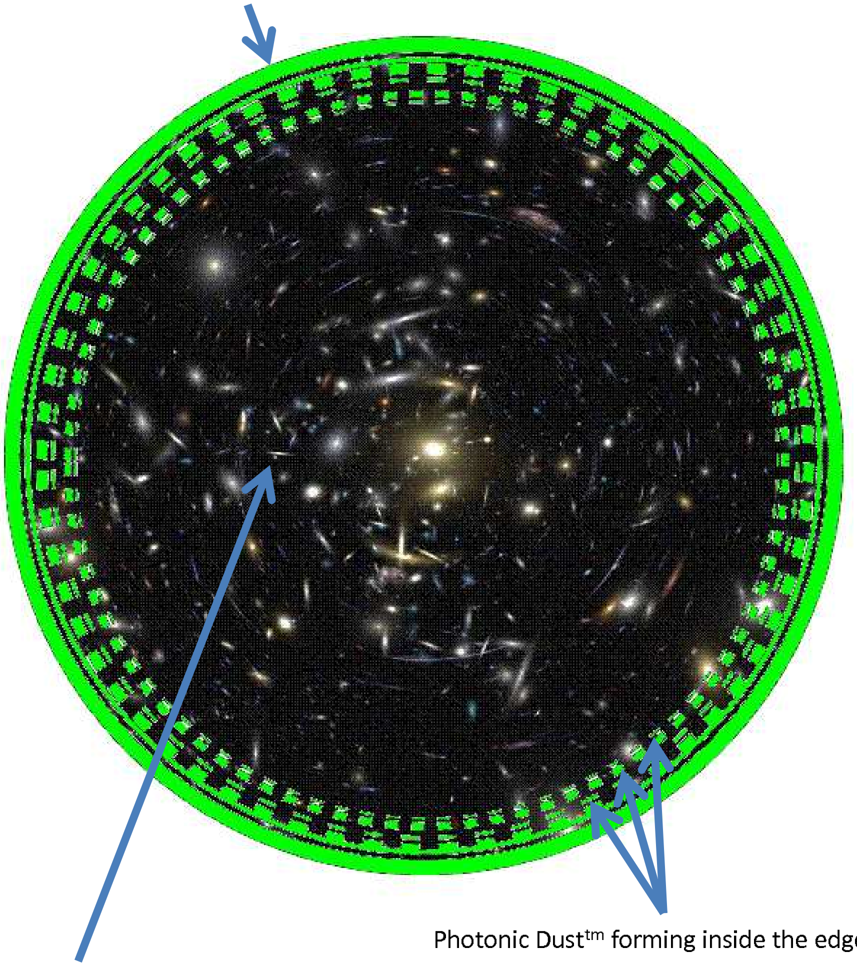
- The photon-particle is not alone in its flight from the transmitter, our UV laser puts out millions of identical photons each second and thus there would be millions of identical particles traveling through space parallel to each other as a kind of photonic dust™. How are these something particles experienced by their neighbors in the dust if the source were to reach a v = c?
- They may attract or repel each other magnetically or electrically, combine or bounce off each other, or collide and annihilate each other but regardless of the driver or type of interaction it should cause them to loose some of their forward momentum.
- A particle with v = c would have a momentum of p=M'c and if mass can be viewed as a form of momentum in space-time, what if we equate that momentum (M'c) to the energy from the source ($E = hf = Mc^2$) we get $M'c = QMc^2$ (Q being some as of yet undetermined factor) then the perceived mass would be given by $M' = QMc$? The perceived mass of a single photonic dust™ particle from one photon of light with a source frequency of f would be $M' = Qhf/c$? This would be a significantly larger mass then it was in the transmission reference frame as one of the c components has been canceled out.
- Traditionally mass is thought to have a distorting effect on space-time and this distortion is felt as the force of gravity, but is it possible that it is a distortion in space-time that is experienced by others in the same reference frame as a nearby mass?
- So, what is this unknown factor *Q* and how does it relate to G?

When Δv = c

Back on the receiving spacecraft

- For these particles to be detected by the receiver they must collide with the craft's antenna. The photonic particle's v would suddenly go from near c to 0 and thus the particle would impart a force (energy) of Mc^2 ?
- If the spacecraft's antenna is able to move as little as 1 cm/s along the body of the craft towards the transmitter while the crafts' Δv = c, then the transmitter to antenna Δv = c-1cm/s and thus the signal would be experienced as 306Mhz radio. With the antenna stopped the signal would again be experienced as photonic dust™ particles traveling near c.
- In other words these particles would appear and disappear as the receiver made minor changes in velocity relative to the transmitter.
- What if there were another transmitter with a Δv = c to the receiver but traveling the opposite direction of the original sender. A change of 1cm/s to the left in the movement of the receiver's antenna would cause the left signal to go from particle to wave and the right signal from wave to particle ?
- What if the receiver were surrounded spherically by a EM energy source that was expanding at c and the receiver was not on a well behaved path but rather spinning on a tilted axis around a larger axis of rotation the center of which is traveling an even larger circular path through the space within this "bubble"?

You, Me and the CMB

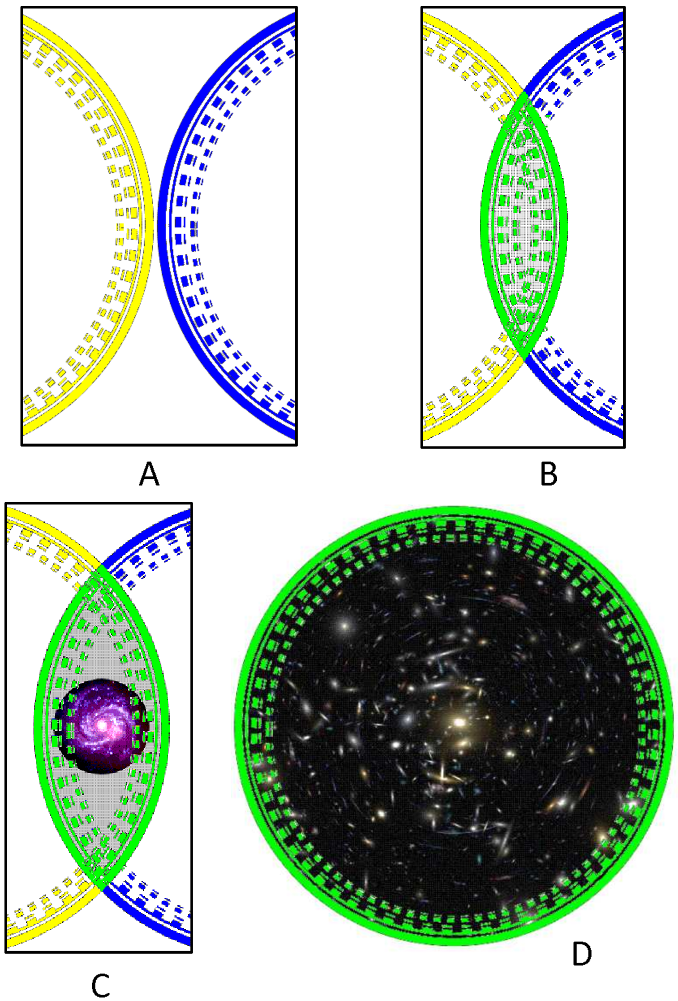


- As is turns out our universe is surrounded spherically by an EM energy source that is expanding at c.
- In every direction that our radio-astronomers point the dishes of their receivers a faint microwave signal is received. This signal is referred to as the Cosmic Microwave Background and is often pointed to as proof of the Big Bang theory. The belief is that the light created by the explosion of the Big Bang traveling out into space at c has been red-shifted to the microwave band by the time it is detected by us.
- Regardless of its source the receivers we use to detect the CMB are spinning around with the "tilted" earth at roughly 1,600 km/h which is also orbiting the "tilted" sun at roughly 107,000 km/h which is also orbiting the center of the "tilted" Milky Way galaxy at something on the order of 860,000 km/h. Is it any wonder that our maps of the CMB appear to show it as random?
- Would it be possible to adjust the map of the CMB to compensate for the tumbling path of our receivers? Would the map be any less random in appearance if viewed from the perspective of standing on the axis of the Milky Way?

The Big Bang Theory

- As the story goes, about 14 billion years ago all the matter in the universe was compressed into a hot dense point where it sat until one day it exploded in a "Big Bang" creating time, life, the universe, and everything.
- The first, most obvious, issue with this theory is "Where did the hot, dense matter come from to begin with?"
- The second problem with this theory is that while the bang happened 14 billion years ago, the universe was recently measured to be 156 billion light years wide. So how did the universe's outer edge travel 73 billion light years in only 14 billion years without going faster then c?
- The third problem is that portions of the observed universe are to similar to have not been in contact some time during their past, however, they are too young and too far apart to have been in contact during their lifetime without traveling faster then c.

The Whiz Bang Theory™



One day back in the middle of time some 73 billion years ago, perhaps on a Tuesday, the outer edges of two pre-existing universe bubbles (a), both expanding at the speed of light, each trailing photonic dust™ behind them, mixed as they whizzed through each other creating a new bubble in space(b). Within this new bubble the photonic dust™ spewing from the inner walls is directed towards the new center where it interacts and accumulates into a nucleus.

For billions of years, as this new bubble expanded, its nucleus of photonic dust™ particles coalesced (c), increasing in density, first forming into a black hole before the nucleus' gravity was too great for the atomic forces holding the particles apart to be maintained.

14 billion years ago, this black hole went bang! (d) resulting in a great variety of particles, elements, and a large portion of the visible universe including our Milky Way Galaxy.

Big Bang vs. Whiz Bang™

The first big problem with the Big Bang Theory

- Often scientists will try to get around the question of "Where did the hot, dense matter come from to begin with?" by postulating that the Big Bang started as a singularity of immense energy rather then immensely dense matter. One reason for this idea is that in order for all the matter in the entire universe (not just the matter within 14 billion light years of the center) to be compressed into a single tiny speck, there has to be some form of strong quantum level gravity and after decades of research it has yet to be found either experimentally or mathematically. In the end, because most proponents of the Big Bang believe it to be the single instant of all creation, the very start of space and time itself, one is still left with the question: "Where did all that immense energy come from to begin with?"
- The belief that our big bang must be the creation of everything , despite the evidence of a "before the bang", appears to be driven by the same need that once caused people to believe that the earth was the center of the universe.
- The Whiz Bang™ Theory attempts to describe the creation of our universe bubble based upon the evidence at hand and does not assume that our bubble or bang are either the first or have ever been alone in the multi-verse.

Big Bang vs. Whiz Bang™

The second big problem with the Big Bang Theory

- The second big problem is “How did the outer edge of the universe travel 73 billion light years in only 14 billion years without going faster then c?”
- This problem is usually explained away with: “The rate of cosmic expansion must have been much greater during the early universe then it is now observed to be.” However, there is no possible proof of this or evidence of a force that would make the rate of cosmic expansion slow down enough to be what it is today.
- Under Whiz Bang™ our universe is formed from the outside-in rather then the Big Bang’s center-out meaning that the bang that we see evidence of happening 14 billion years ago was caused by the source of the CMB rather then the other way around.
- To work out the truth of this it would help if we knew:
  - Where is the center of the Big Bang?
  - What sits at the outer edge of the Big Bang (14 bly from its center)?
  - How do the variety and types of matter inside and outside the 14 bly Big Bang sphere differ.

Big Bang vs. Whiz Bang™

The third big problem with the Big Bang Theory

- The third big problem: “Portions of the observed universe are too similar to have not been in contact some time during their past, yet they are too far apart to have been in contact during their lifetime without traveling faster then c.”
- Often this problem is also explained away with “Cosmic Expansion” or more controversially with the Variable Speed Of light (VSL) concept which is far more problematic for the rest of astrophysics since it would mean that c is not a fundamental constant of physics at all times.
- Under Whiz Bang’s™ outside-in model both halves of the green universe bubble are formed from the intersection of the yellow and blue bubbles. As energy waves the green bubble is thus the result of wave interference. This then means that the green bubble, at least initially, should exhibit some form of symmetry.
- If particles are in fact streaming inward from the edge of this bubble then it is reasonable possible for two portions of the universe to be very similar even though they are too far apart and too young to have been in contact if they had traveled from the center out, so long as they are similar distances from the intersection along and within the bubble’s edge.

Further Implications of Whiz Bang™

- If the source of the CMB is the result of the interaction of two or more intersecting big bangs and not from our big bang 14 billion years ago then our big bang may in fact be a source for a future universe bubble due to its outer edge colliding with yet another bubble. This could then be viewed as a cosmic scale foam with parallels to the quantum level foam.
- A universe bubble formed under this theory, as the result of wave interference, also parallels the concept of the universe being "holographic".
- The CMB is not the only thing in the universe observed to be emitting EM radiation and traveling away from us at nearly the speed of light. Neutron binary stars as the orbit each other at greater and greater velocities, just before they fully collide, are traveling in a tight circle at nearly the speed of light and thus as each star spins away from us it's EM energy not only throws off massive gravitational waves but also great quantities of photon-particles™.