Re: Fermi's Paradox and Seti (was DNA)

Source: http://sci.tech−archive.net/Archive/sci.physics.research/2006−01/msg00218.html

- *From*: terry@xxxxxxxxxxxxxxxxxxx (Terry Pilling)

- *Date*: Wed, 25 Jan 2006 01:25:40 +0000 (UTC)

AndyCav <a.m.ciavarella@xxxxxxxxxxxx> wrote:

> I think that Fermi's paradox suggests a low formation rate for intelligent
> life only with a certain assumpion: that intelligent life would be
> *obvious*. I mean, would intelligent aliens necessarily visit us? What if
> life is *so* common that they can't be bothered − they've seen our type a
> million times before?! And would an alien race be so energetically
> ineffiecient that they could be detected from lightyears away?

This is very true. I have wondered about this also. Carl Sagan's Seti program was based on the idea that intelligent life would be deliberately transmitting messages in focussed beams. So Perhaps the reason Fermi didn't see his aliens everywhere is simply that they are like us, passive transmitters. In which case the signal would be far too weak to detect except for the very closest stars.

<begin aside>
Aside about Sagan: Probably you know that Sagan designed a famous plaque which was carried on the two Pioneer spacecraft and are now headed out into the galaxy like a ``galactic message in a bottle''. Well, on the plaque are some interesting and informative things, in particular, a distance scale is set by the hydrogen atom, which also sets a time duration scale in terms of the number of hyperfine transitions of the hydrogen atom. A time duration which we know to be 7.04024183647 x 10^−10 seconds and we can assume any other intelligence would also know this. With this time scale Sagan listed a bunch of pulsars along with their distance and periods of pulsation. For example, the 7th pulsar listed is PSR 0531 in the crab nebula (M1) [see: http://chandra.harvard.edu/photo/2002/0052/movies.html for something I consider to be very cool! I even put a question on an electrodynamics midterm exam last semester about the magnetic fields generated by this thing.] Its rate is given on Sagan's plaque as 47057538 hyperfine transition periods. This is 33.1 ms. However, the pulsar is slowing down at a rate of 10^−8 seconds per day! This means that since the launch in 1972 the pulsars rate has slowed down and is now only 33.3 ms. So any aliens getting our message (especially in a few million years!) will have great difficulty triangulating our position (all of the pulsars on the list are slowing down over time). In addition to this, the pulsars are all moving through space! So by the time an alien

civilization gets the message the pulsars will all be in completely
different relative positions to the earth, making the message useless!

So I have an idea for an update of the plaque: We should list, in
addition to the pulsation periods, the decelerations of the pulsation
periods. The decelerations would allow them to find the pulsars (assuming
the decelerations are also constant) and the period data themselves will
allow them to figure out the travel time of the spacecraft since launch,
These will allow them to back trace the original positions of the
pulsars at time of launch (assuming they know the relative motions of
at least 4 pulsars) and thus finally triangulate our position at
time of launch. Then forward track our local motion to find our
position at the time of their discovery of the spacecraft!
Whew! Sounds complicated I know, but the original plaque, without
the deceleration data is impossible. As it stands now, the best
way for an alien to find the earth from a discovery of the pioneer
is to back track the spacecraft itself and forget the plaque altogether!
<end aside>

> And there's something which I think NEVER gets enough attention: what if
> faster than light travel just ISN'T possible?! Civilisations would spread
> out in galactically, relatively very small bubbles of civilisation − which
> may not be anywhere near us! What's a hundred or so light years, or a
> thousand, compared to the length scale of the galaxy?! − 10,000s of
> lightyears!!!

I am convinced that faster than light travel is, in fact, not
possible. This comes from special relativity and causality and I have
not heard of any reasonable ideas, using normal physics and normal
matter, which could allow FTL without closed timelike loops,
causality violations, and/or unitarity violations in QFT. On the
other hand, great distances can be traversed in the galaxy within
a human beings lifetime (their `proper' lifetime that is) as long
as they don't mind the fact that thousands of years will have
passed by back at home while they travel.
In fact, I think the first obstacle to interstellar travel
that the human race will overcome is our too short lifespan.
We will soon overcome this and vastly increase our lifespan and
thus enable us to make long journeys in the galaxy.
This would indicate that other space−travelling civilizations in the
galaxy will have long lifespans as well and thus we return again
to Fermi's paradox: why haven't they travelled here?

Is it because there are more than 200 billion stars in the milky way
and far fewer civilizations, so that in effect they just haven't got
to us yet?

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−Terry

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- ***Follow−Ups***:
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- ***References***:
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