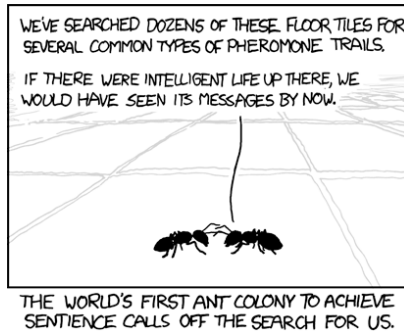


Final Review



Key Ideas

- f_c
 - What are the important factors for estimating f_c ?
 - Cultural evolution
 - Worldview & Technology
- Worldview
 - Geocentric and heliocentric models
- L
 - What are the important factors for estimating L ?
 - Possible ways to kill a civilization
- Search for extraterrestrial life
- Space travel
- Conclusions?

f_c : Evolution of Worldview

- How does ancient astronomy compare with their worldview (i.e. place in the Universe)?
- Ptolemaic System
 - What is it?
 - How does it explain retrograde motions?
- Copernican Theory
 - What is it?
 - How does it explain retrograde motions?
- Kepler did what?
- Galileo did what? With what? Saw what?
- Newton did what?
- Heliocentric model
 - What is the evidence?
- Copernican revolutions
 - What do we mean?

f_c

- Cultural evolution
 - What is Extrasomatic storage? Give some examples.
 - What is the critical breakthrough of human cultural evolution?
 - What is technological evolution?
 - What are the major breakthroughs of technology?

L

- What is L?
- What are the four cases to determine lifetime of a civilization?
- Explain energy solutions.
 - What are possible energy sources for a civilization?
 - Which is the most likely advanced energy source with technology today?
 - What is a Dyson Sphere?
- Possible ways to kill a civilization
 - Sun evolution
 - How many years until the Sun becomes a red giant?
 - When does the Sun's evolution affect us the most? Is it multiple times?
 - Asteroids/impacts
 - Is there any way to keep asteroids from hitting the Earth?
 - Killer supernova
 - How would a supernova kill the civilization on Earth?
 - Stars burn out
 - When will this happen?
 - End of Universe: How can cosmology kills us?

Continue.....Search for aliens

- In what range of frequency should we search for ET?
Why? Is radio the only option?
- What is the communicational haystack?
- What are leakage signals?
- Radio telescope
 - What factors affect the sensitivity of radio telescopes?
 - How does the size of the dish relate to the field of view?
 - Dish decision
 - In which case should we use a big dish? In which case should we use a small dish?

Search for Extraterrestrial Life

- What is the Fermi paradox? What does it mean?
- How do we estimate the distance to our nearest neighbors? What is the search volume dependent upon?
- What implications?

Continue....Talk to aliens?

- What is the difference between FM and AM
- Arecibo message
 - What is it?
 - Is the signal FM or AM?
 - Is it hard to decipher?
- The Wow signal
 - What is it?
- LGM
 - What is it? What did it turn out to be?
- What is the Condon report?

Space Travel

- How does a rocket work?
- Describe the important rocket quantities qualitatively?
- What are the three big problems of interstellar flight?
- What happens when you travel close to the speed of light?
- What are the possible energy source for space travel?
 - Which one is the most likely energy source for space travel today?
 - Which one is the most efficient way to generate energy?
 - Discuss the different spacecraft designs.

Conclusion

- What is the conclusion of this class?
 - Is anybody out there?
 - Have we been visited by aliens?
 - Any scientific evidences for those UFO pictures? Videos? Crop circles? Etc...