

Monday, December 2, 2007

Vilenkin Part III & Movie

Agenda

- Announce:
 - Read Part IV
- Criticisms of the Anthropic Principle
- Part III

The Anthropic Principle

- *If things were different, things would not be the way things are.*—Bob Parks
- *It tends to be invoked by theorists whenever they do not have a good enough theory to explain the observed facts.*—Sir Robert Penrose
- Dr. Gould compared the claim that the universe is fine-tuned for the benefit of our kind of life to claiming that hotdogs were originally made long and narrow so that they would fit modern hotdog buns

A Good Example of an Anthropic-type Argument

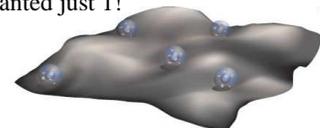
- Why is the vision of most animals on Earth see developed to see in what we call the “visible spectrum”?

Ch. 15—String Theory

- Spacetime of 10 dimensions
- No adjustable parameters—it is what it is
- But choices in how one compactifies the extra six dimension
- Originally hoped for a unique compactification
- But addition of Branes eventually led to lots of different compactifications...

String Theory Hits a Snag

- Instead of a single scalar field with one true vacuum
- Hundreds of fields/dimensions...complicated to visualize
- In 2D, like a sheet with many valleys..each valley is a possible vacuum
- Roughly 10^{500} different vacuums!
- Disaster when you wanted just 1!



Make Lemonade!

- All those vacuums are great...it means there's got to be one that matches our universe
- If we could just find a way that each would be sampled.....



String Inflation!

- Combine eternal inflation with string theory
- Every vacuum eventually bubbles up
- We happen to find ourselves in one that could support intelligent life (has atoms & galaxies)!
- Perfect Match! We predicted ourselves!