



Disclaimer



This series represents the personal views of scientists who attend Grace Chapel.

Our understanding of science continually changes with new data and so will our views.

Therefore, the views we will be presenting should not be taken as absolute truth.

Alternative views on science and faith are not only possible but expected as well as encouraged.

The Origin and Design of the Universe

Dennis Rathman

Most of the information in this talk was derived from
resources available from Reasons to Believe (RTB)
Website --- www.reasons.org

Prevailing View of the Universe from Isaac Newton to the 20th Century

- Universe is infinitely large/old- no origin
- Universe is static-not expanding
- Laws of physics constant

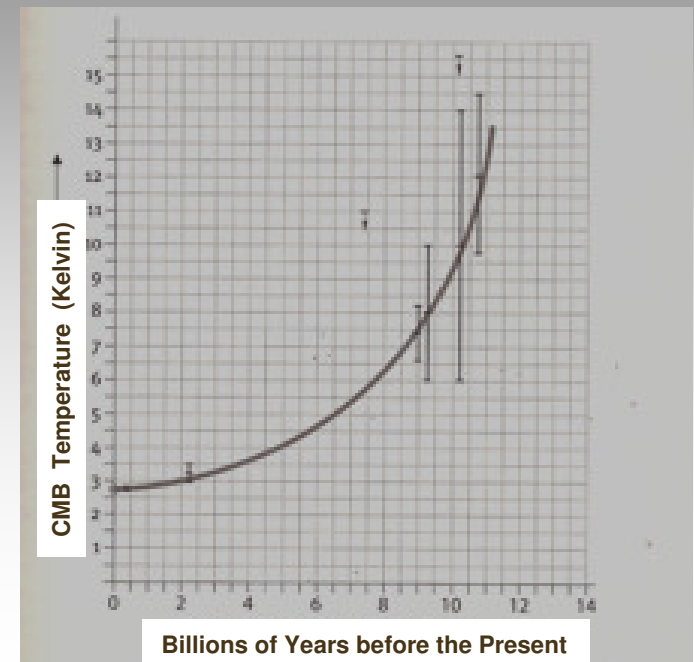
This changed with Einstein's Theory of General Relativity and Edwin Hubble's observation of an expanding universe



Origin of the Universe from Modern Science

- Universe has a beginning
 - All matter, energy, space and time have a beginning
- Universe is continuously expanding
- Constant laws of Physics
 - General Relativity confirmed to one-trillionth % precision

Cosmic Cooling Measurements from 8 epochs



Space-Time Theorem Proofs on the Origin of the Universe

- Hawking and Penrose expanded Einstein theory to prove that space and time had a beginning
- A beginning requires a “Beginner”
- Valenkin, Borodin and Guth looked at various possible origin scenarios
 - Including scenarios that do not depend on the validity of general relativity

If the universe is expanding on average a causal agent outside the universe is required

What the Bible Says About the Origin of the Universe (2000-3500 Years Ago)

- Universe had a beginning- “In the beginning God created the heavens and the earth....”
– **Genesis 1:1 and Hebrews 11:3**
- Universe is expanding- “He alone stretches out the heavens”
– **Job 9:8**
- The laws of the heavens and earth are fixed
– **Jeremiah 33:25**

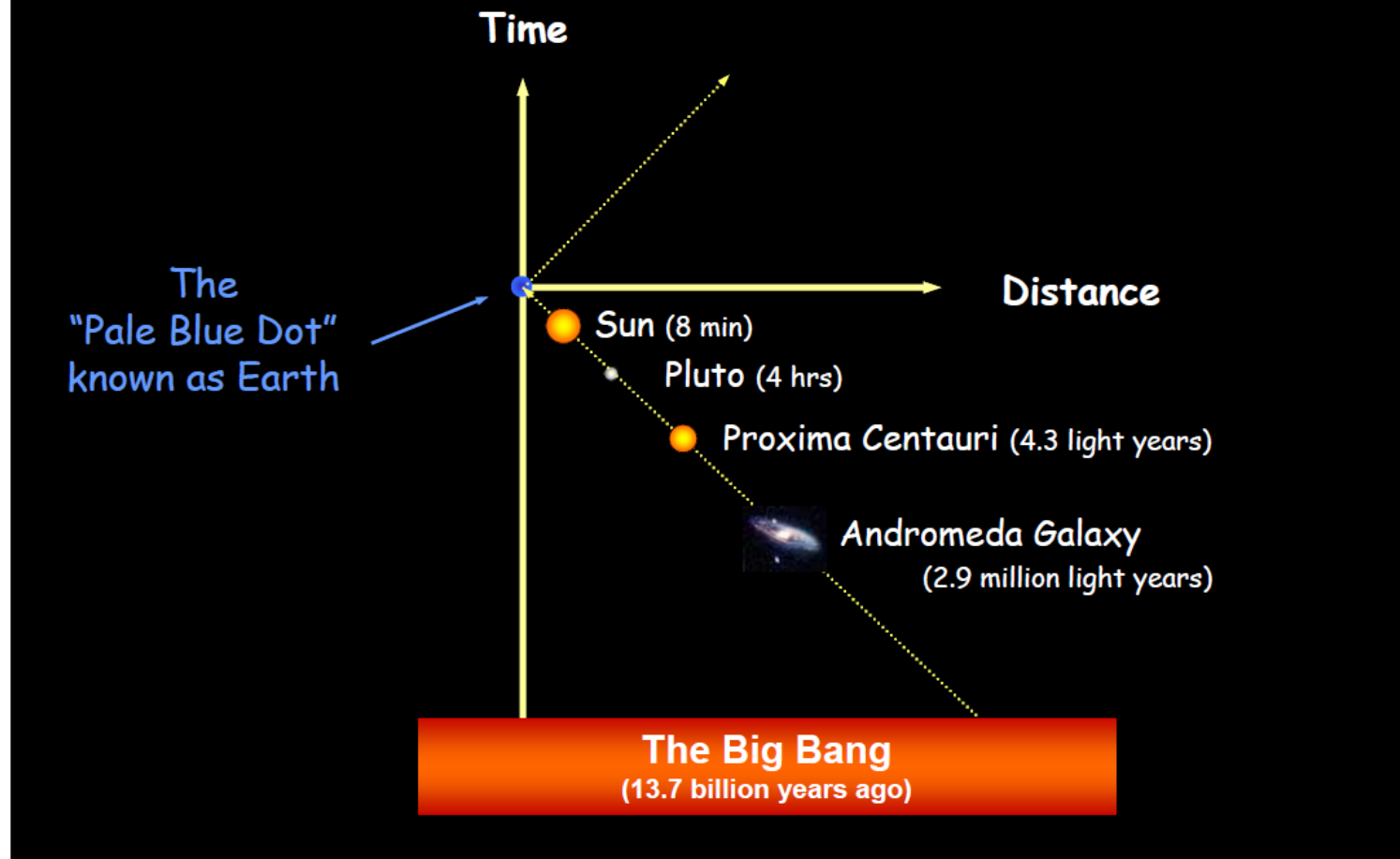
Expansion of the Universe According to the Bible (3500 yrs ago)

- **Job 9:8- “He [God] alone stretches out the heavens.”**
 - The verb tense (Qal active participle) of *natah* implies ongoing continual expansion
 - God alone controls the expansion
 - God’s “stretching of the heavens” appears 10 other times in the Old Testament
 - (Ps. 104:2, Isa.40:22, 42:5, 44:24, 45:12, 48:13; 51:13; Jer.10:12; Zech.12:1)
 - Four verses here (Qal perfect form) implying expansion completed (in the past)-- **(thus both completed and ongoing expansion)**

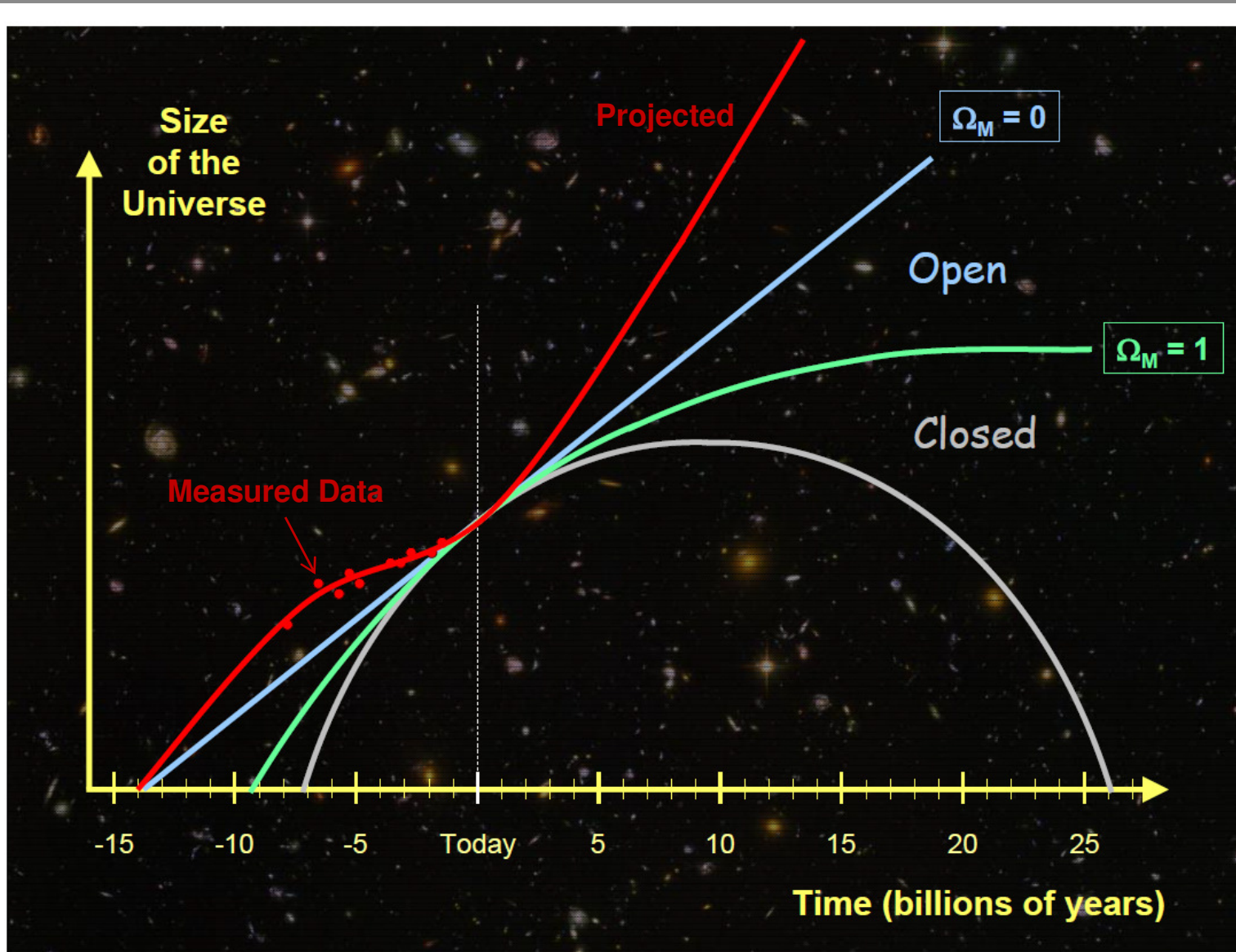
Astronomy is a Time Machine

Thank God for the Finite Speed of Light

We can view nearly back to the time of the Big Bang
- 99.9972% of all of cosmic history



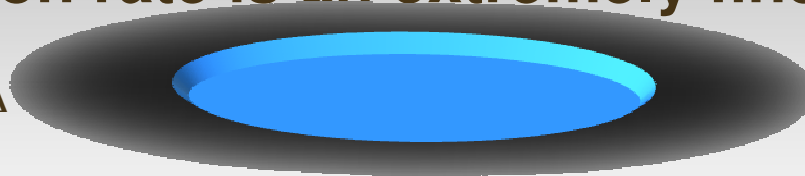
Universe Expansion VS Time



Expansion of the Universe From Science

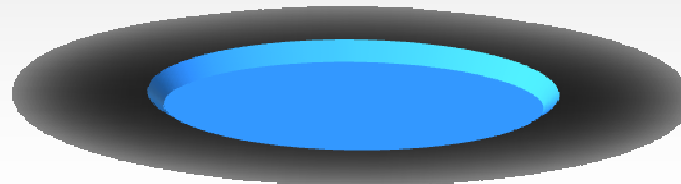
- The 2011 Nobel Prize in Physics was awarded to three teams of scientists confirming the ongoing continual expansion of the universe
 - Expansion rate is increasing (unexpected)
- The expansion rate is an extremely fine-tuned parameter

If expansion rate
slightly faster $+\Delta$



No stars, planets or
life –EVER

If expansion rate
slightly slower $-\Delta$



Only black holes or
neutron stars—
NO LIFE EVER

- The primary component of the expansion is something called “dark energy” (space-energy density)

Primary Component of the Expansion of the Universe

- Dark energy: Self-stretching property of the universe as spatial dimensions expand
- We do NOT know its origin (not one of the fundamental forces of physics)
- It is believed to be fine-tuned to 1 part in 10^{122} (the number 1 with 122 zeroes)
- Lawrence Krauss calls this “the greatest problem in the history of science”



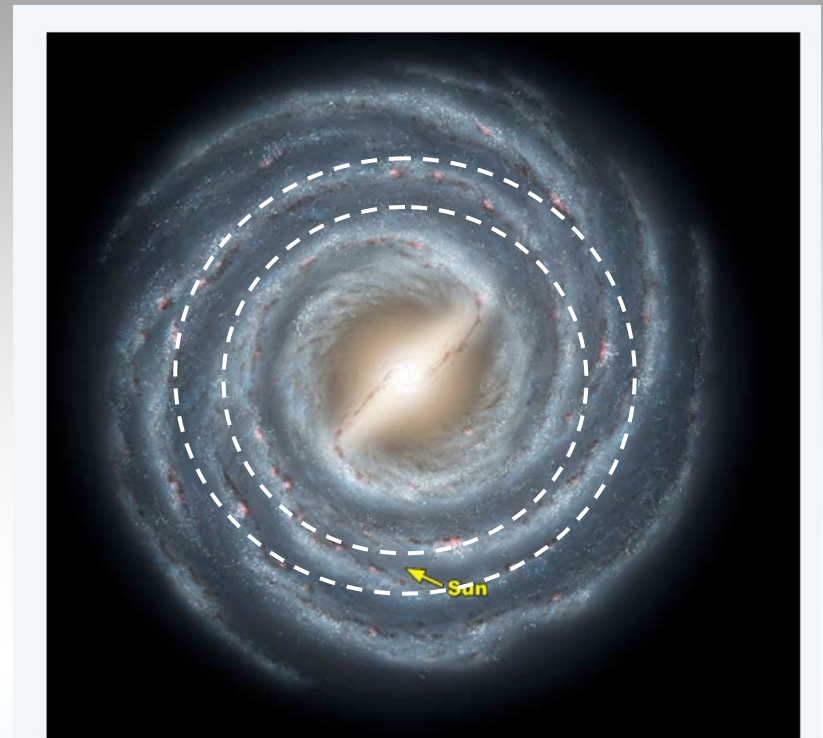
Fine Tuning in the Universe

- Scientists have discovered many fundamental constants and forces that appear to be fine-tuned and specifically fine-tuned for human life
- This has become known as the “anthropic” principle
- Two categories:
 - Fundamental- set near creation event (e.g relative strength of the forces, mass density and expansion rate of the universe)
 - Environmental- fine tuned quantities that vary with location or time in the universe (e.g planet/moon size, star type, galaxy type and size, etc.)



Five Reasons Indicating That God Intended Us to Be Here and Recognize His Intentions

- 1. We live in the just right time to observe cosmic history**
 - Able to see all of cosmic history
 - Any earlier -too early ; any later-too late
- 2. We live in the just right location to observe cosmic history**
 - Location in galaxy just dark enough for required visibility



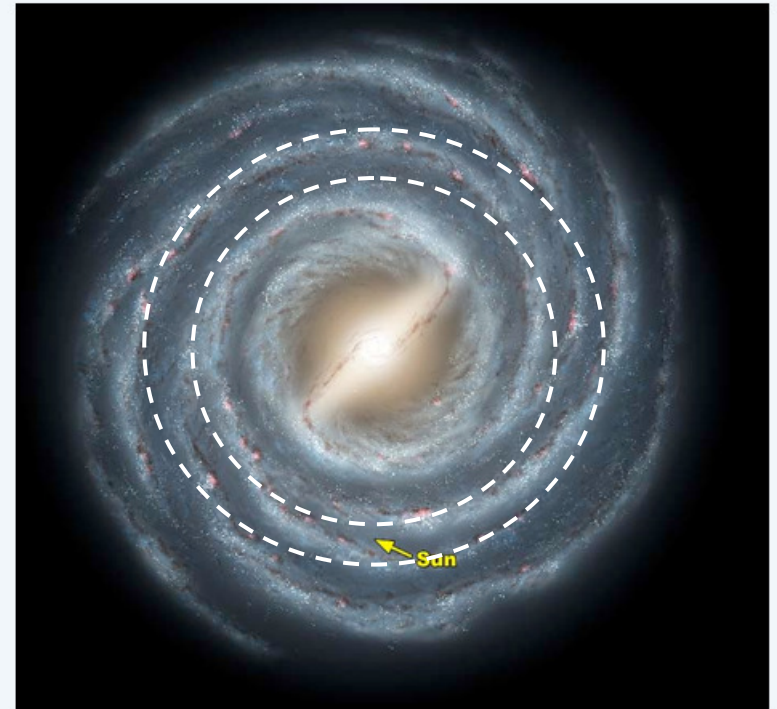
Artist rendering – Milky Way Galaxy

Psalms 19:1 “The heavens declare the glory of God.....”

Reasons 3 & 4

3. We live in the right moment in time for life
 - Life essential elements (C, O, N etc.) require 3rd generation stars

4. We live in the right location for life
 - While life requires sufficient quantities of these elements we require protection from the deadly radiation associated with their source



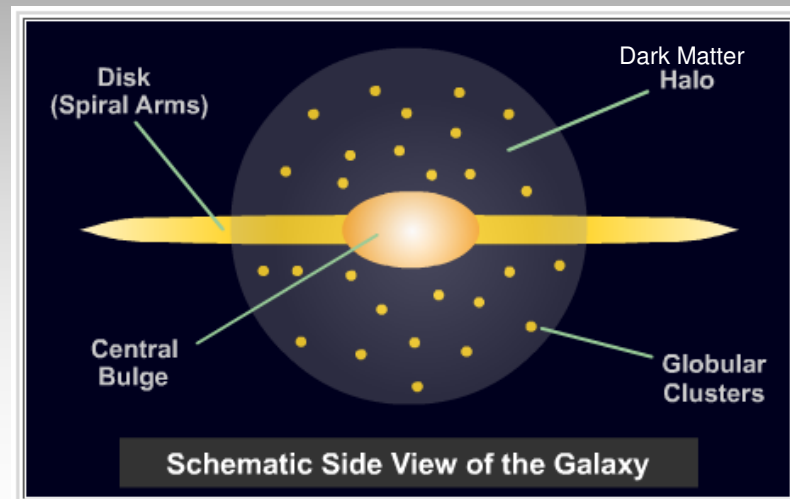
Between dashed lines- habitable zone

Psalms 19:1 “..the skies proclaim the work of His hands”

Reason 5

- All matter and energy in the universe is needed for life to exist anywhere, anytime in the universe

<u>Component</u> (universe stuff)	<u>%</u>
Dark energy	72.1
Exotic dark matter	23.3
Ordinary dark matter	4.35
Ordinary bright matter (stars)	0.27
Planets	0.0001



- Any more or less would result in a different suite of elements either too light or too heavy for life chemistry

Job 38:19-20 “...where does the darkness reside?”

Who Is Afraid of the Multiverse ? *

- **What is the multiverse? – Postulate that regions (universe(s)) exist beyond our observable universe- could include multiple separate existing universes**
 - Level 1- Multiple separate or partially overlapping universes that exhibit the same physical laws
 - Level 2- Multiple universes presumably with different laws of physics
 - Other models exist including (Level 4) an ensemble of every conceivable universe
- **Primary intent from Stephen Hawking- multiverse hypothesis is really the only way to get around the implication that our universe is fine-tuned**

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Info derived from booklet by Dr. Jeff Zweerink from Reasons to Believe

Multiverse Impact on Christian Worldview

- **Does the multiverse have a beginning ?**
 - **BVG space time theorems demonstrate that any cosmos that expands on average (a la inflationary multiverse) must have a beginning**
- **Do multiverse models account for fine tuning or the appearance of design ?**
 - **The number of fine-tuned parameters required by human life suggests that our universe would be atypical (very low probability) which still indicates design**
- **Does our universe contain non-physical entities ?**
 - **Does our spirit/soul (“image of God”) arise as a gift from God or by purely physical means ?**

Summary

- **The Bible and Science agree that our universe is expanding but the Bible said it first**
- **The Bible and Science agree that the universe (single or multiverse) has a beginning → a “Beginner”**
- **Scientists agree that OUR universe exhibits extreme fine-tuning (if multiverse our universe is atypical) → a “Designer”**
- **A number of large-scale indicators show that God cares for us and elucidates His intentions for us**

Requirements for a Naturalistic Multiverse Model

- **Model must be self-contained- no beginning or true design because both imply → a “Beginner/Designer”**
- **Must account for all observational data and our universe as one of the possible universes**
- **Must provide mechanism for sufficient variety of universes-to explain apparent fine-tuning**
- **Demands that life is solely physical**