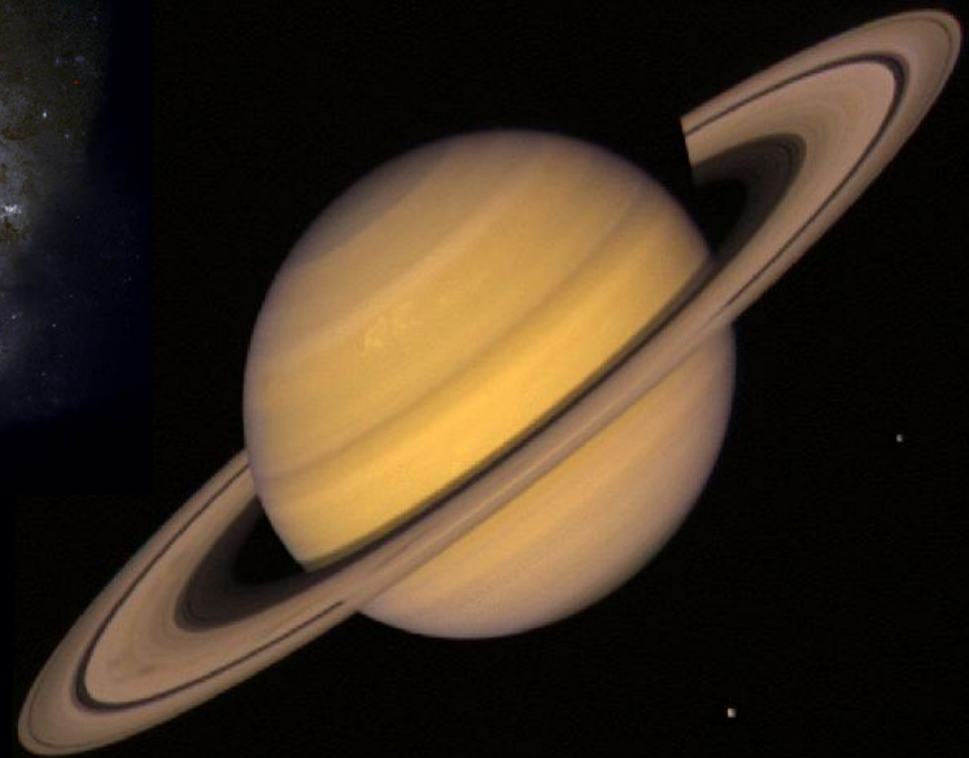


The heavens declare the glory of God; and the firmament sheweth his handiwork. – Psalm 19:1





If you have & return top winning entry, we'll say ...

**CLARE YU, WE'VE
BEEN SEARCHING FOR YOU ...
YOU'VE JUST BEEN POSITIVELY
IDENTIFIED AS OUR \$11,000,000
MYSTERY MILLIONAIRE FROM CA!**

SCRATCH OFF UNSOLVED MYSTERY area to reveal your prize claim number and cash level code. Then fill all entire price claim token and affix to Entry-Order Card.

This Is To Certify that American Family Publishers has officially guaranteed new cash prizes of up to \$11,000,000.00 and is actively seeking winners for these prizes in IRVINE and everywhere in the State of CALIFORNIA and throughout the country.

CLARE YU of IRVINE has already been preliminarily identified as a candidate for prizes in the MILLIONS having passed through Stages I and II, name identification and number registration. And because you made our big mailing list of people all across America, your numbers automatically entered the third and Last Stage awaiting advancement to the \$11,000,000.00 winner selection step.

** ECRL0T ** C034
10-12

Clare Yu
26 Whitman Ct.
Irvine, CA 92612-4057

EXTREMELY IMPORTANT:

Scratch off UNSOLVED MYSTERY pattern on Mystery Millionaire prize claim token above to reveal your cash code. Next scratch off gold bars below to find a matching code and then your cash prize eligibility level.

MANDATORY MAR. 7 DEADLINE!

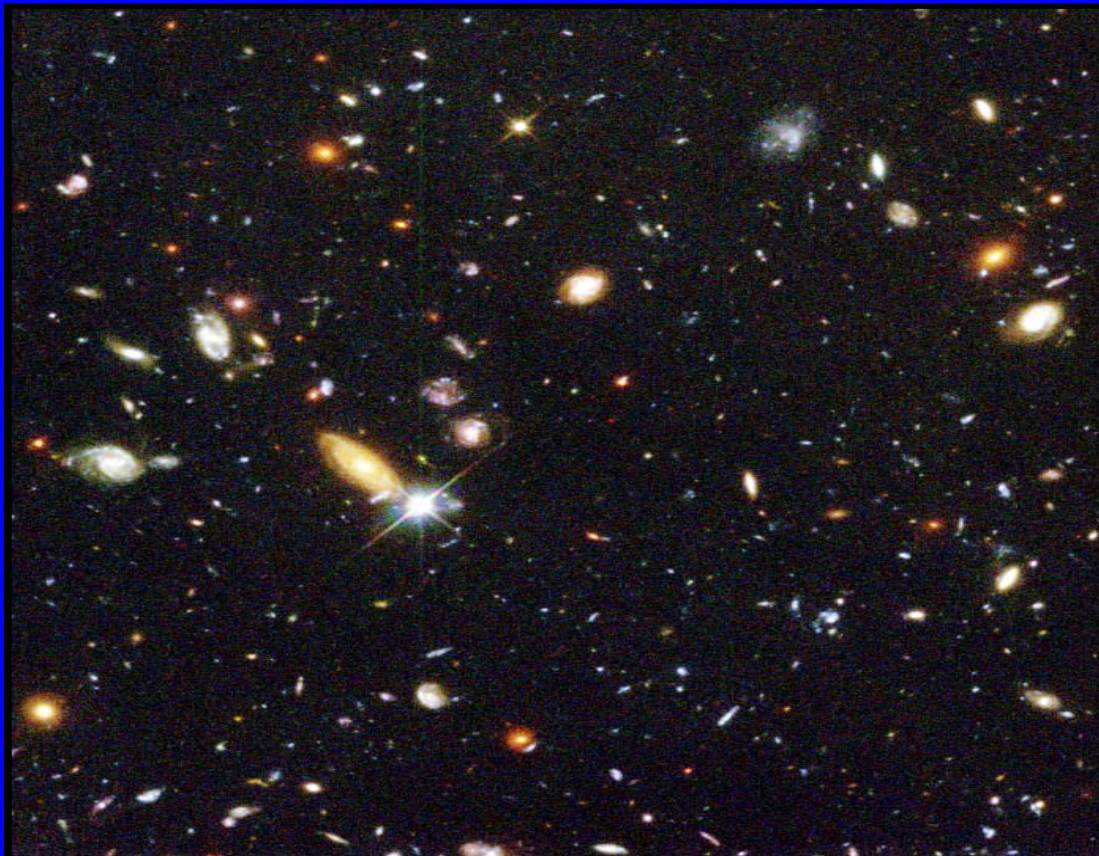
CASH CODES	CASH PRIZE ELIGIBILITY
[Scratched Area]	[Scratched Area]
[Scratched Area]	[Scratched Area]
[Scratched Area]	[Scratched Area]

If you look up at the sky at night, the heavens appear to be unchanging. In 1917 Einstein wrote down the theory of General Relativity. His equations indicated that the universe was

expanding and decelerating. He believed that the universe was unchanging so he put in the cosmological constant to fix his equations.



In 1929 Edwin Hubble found that galaxies are flying away from us in every direction. The farther they are, the faster they are receding. This is evidence for the expansion of the universe.



Hubble Deep Field

HST · WFPC2

PRC96-01a · ST ScI OPO · January 15, 1996 · R. Williams (ST ScI), NASA

The Big Bang

Scientists now believe that the universe began in a tremendous release of energy known as the Big Bang. The universe has been expanding ever since. Evidence for this:

- Observation of galaxies flying away from us in all directions (Hubble's observations).

GENESIS

CHAPTER 1

In the ^abeginning ^aGod created ^athe heaven and the earth.

2 And the earth was ^awithout form, and void; and darkness was upon the face of the deep. ^aAnd the spirit of God moved upon the face of the waters.

3 ^aAnd God said, ^aLet there be light: and there was light.

4 And God saw the light, that it was good: and God divided ^athe light from the darkness.

5 And God called the light ^aDay, and the darkness he called Night. ^aAnd the evening and the morning were the first day.

6 ¶ And God said, ^aLet there be a ^afirmament in the midst of the waters, and let it divide the waters from the waters.

7 And God made the firmament, ^aand divided the waters which were under the firmament from the waters which were ^aabove the firmament: and it was so.

8 And God called the firmament Heaven. And the evening and the morning were the second day.

9 ¶ And God said, ^aLet the waters under the heaven be gathered together unto one place, and let the dry land appear: and it was so.

10 And God called the dry land Earth; and the gathering together of the waters called he Seas: and God saw that it was good.

11 And God said, Let the earth ^abring forth ^agrass, the herb yielding seed, ^aand the fruit tree yielding ^afruit after his kind, whose seed is in itself, upon the earth: and it was so.

12 And the earth brought forth grass, ^aand herb yielding seed after his kind, and the tree yielding fruit, whose seed was

CHAP. I
bc 4004
1 John 1:1, 2
Heb. 1:10
1 Ps. 8:3
Is. 44:24
Acts 17:24
Rev. 4:11
2 Jer. 4:23
2 Ps. 33:6
Is. 40:13, 14
3 Ps. 33:9
2 Cor. 4:6
4 Heb. between the light and between the darkness
5 Ps. 74:16
5 Heb. And the evening was, and the morning was
6 Job 37:18
Jer. 10:12
6 Heb. expansion
7 Prov. 8:28
7 Ps. 148:4
9 Job 26:10
Prov. 8:29
Jer. 5:22
2 Pet. 3:5
11 Heb. 6:7
11 Heb. tender grass
11 Luke 6:44
Heb. between the day and between the night
Ps. 136:8
Heb. for the rule of the day
Ps. 8:3
Job 38:7
Jer. 31:35
Or. creeping
Heb. soul
Heb. let fowl fly
Heb. face of the firmament of heaven
Ps. 104:26
ch. 8:17

in itself, after his kind: and God saw that it was good.

13 And the evening and the morning were the third day.

14 ¶ And God said, Let there be lights in the firmament of the heaven to divide ^athe day from the night; and let them be for signs, and for seasons, and for days, and years:

15 And let them be for lights in the firmament of the heaven to give light upon the earth: and it was so.

16 And God made two great lights; the ^agreater light ^ato rule the day, and the ^alesser light to rule the night: he made ^athe stars also.

17 And God set them in the firmament of the heaven to give light upon the earth,

18 And to ^arule over the day and over the night, and to divide the light from the darkness: and God saw that it was good.

19 And the evening and the morning were the fourth day.

20 And God said, Let the waters bring forth abundantly the ^amoving creature that hath ^alife, and ^afowl that may fly above the earth in the ^aopen firmament of heaven.

21 And ^aGod created great whales, and every living creature that moveth, which the waters brought forth abundantly, after their kind, and every winged fowl after his kind: and God saw that it was good.

22 And God blessed them, saying, ^aBe fruitful, and multiply, and fill the waters in the seas, and let fowl multiply in the earth.

23 And the evening and the morning were the fifth day.

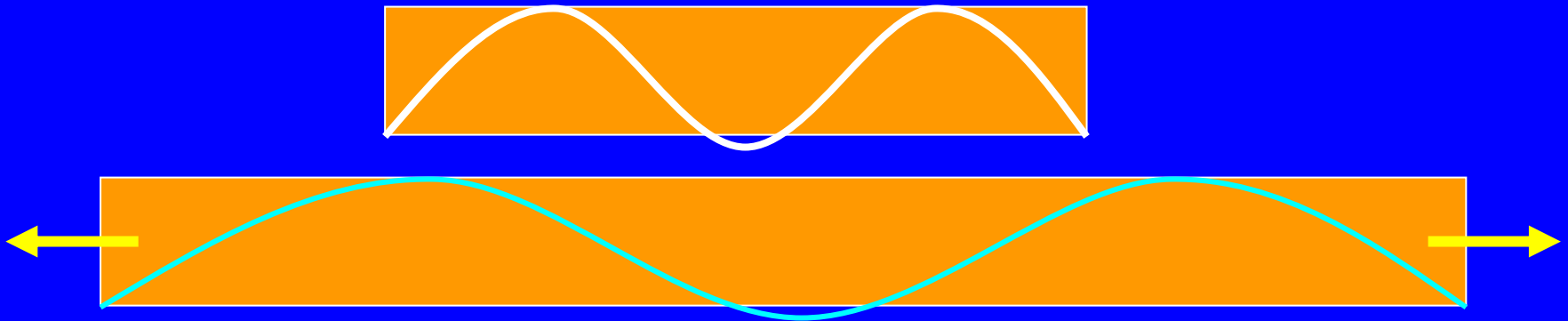
24 ¶ And God said, Let the earth bring forth the living creature after his kind, cattle, and creeping thing, and beast of

Expansion of the Universe

The expansion of the universe can be viewed as stretching the spacetime fabric of the universe.

“It is He ... who stretches out the heavens like a curtain and spreads them out like a tent to dwell in.” – Isaiah 40:22

“ O Lord my God, Thou art very great; ...Stretching out heaven like a tent curtain.” – Psalm 104:1-2



Light waves get stretched out by expansion.

Chance of winning the Publisher's Clearing House Sweepstakes:

1 in 10,000,000 (roughly)

Chance of getting the initial density of the Universe correct (at 10^{-40} seconds after the Big Bang):

1 in 10000 ... 0000

About 55 zeros

The initial density of the universe must be *very* close to the “critical density”:

$$\frac{\text{Initial density}}{\text{Critical density}} = 1 \pm 0.000 \dots 0000001$$

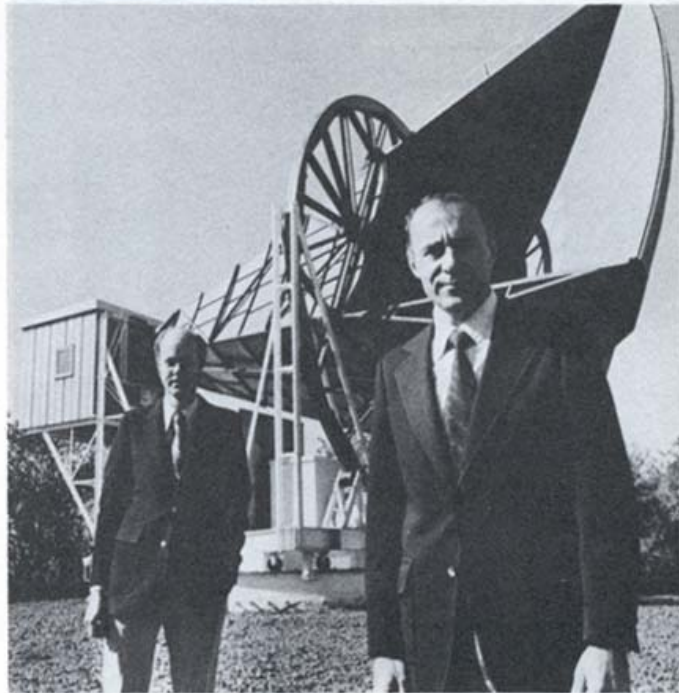
About 55 zeros

Origin of the Universe

Scientists believe that the universe began in a tremendous release of energy known as the Big Bang. The universe has been expanding ever since. Evidence for this:

- Observation of galaxies flying away from us in all directions.
- Remnant of the Big Bang known as the Cosmic Microwave Background Radiation.

In 1964 Penzias and Wilson discovered the remnant heat of the Big Bang. This is called the cosmic microwave background radiation. It is all around us. The universe has cooled off considerably. The radiation corresponds to a temperature of 3 degrees above absolute zero (- 454 F).



The Holmdel Radio Telescope: Arno Penzias (right) and Robert W. Wilson (left) are shown here with the 20-foot horn antenna used by them in 1964-65 in their discovery of the 3° K cosmic microwave radiation background. This telescope is at the Holmdel, New Jersey, site of the Bell Telephone Laboratories. (Bell Telephone Laboratories Photograph)

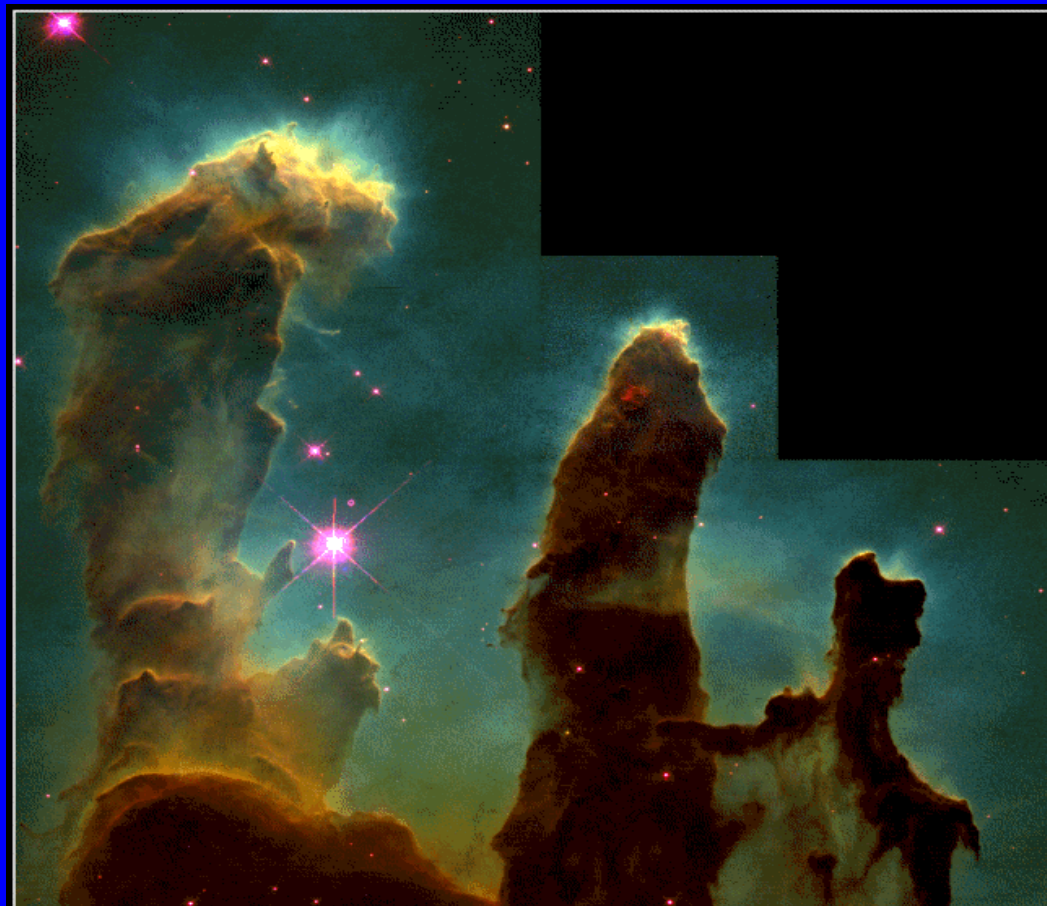
Origin of the Universe

Scientists believe that the universe began in a tremendous release of energy known as the Big Bang. The universe has been expanding ever since. Evidence for this:

- Observation of galaxies flying away from us in all directions.
- Remnant of the Big Bang known as the Cosmic Microwave Background Radiation.
- Observed abundance of light elements made in the Big Bang matches predictions.

Star Formation

Eventually the universe cooled and atoms formed. With the help of gravity these atoms (mostly hydrogen) clumped together to form stars.



Gaseous Pillars · M16

HST · WFPC2

PRC95-44a · ST ScI OPO · November 2, 1995
J. Hester and P. Scowen (AZ State Univ.), NASA

ATOMS

PROTON



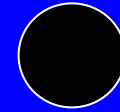
(+)

NEUTRON



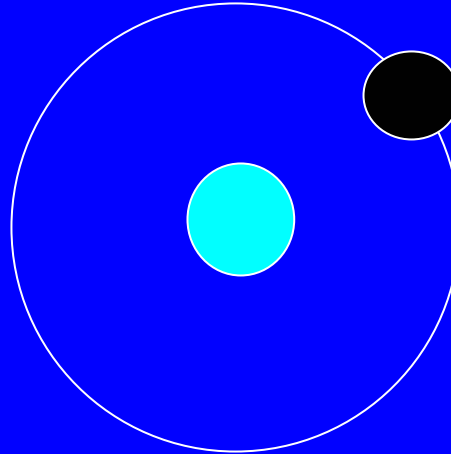
(0)

ELECTRON

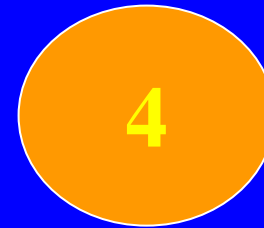
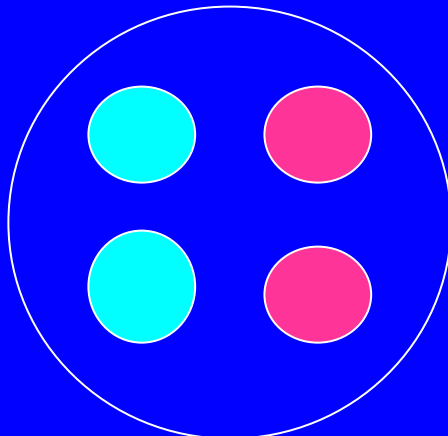


(-)

HYDROGEN ATOM (H)

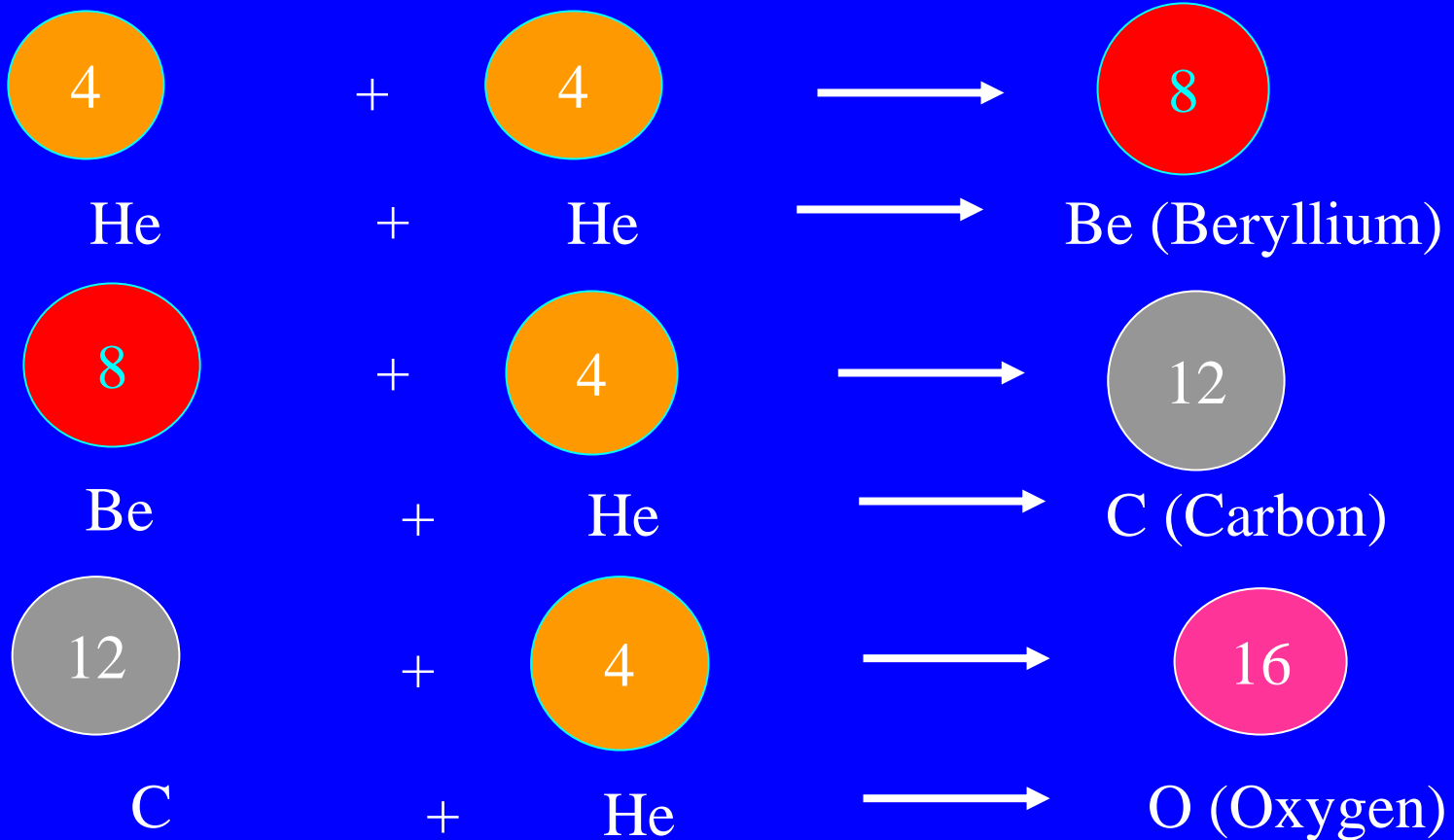


Combine 4 hydrogen atoms to make a helium atom. This is called fusion. It powers the sun.



HELIUM ATOM (He)

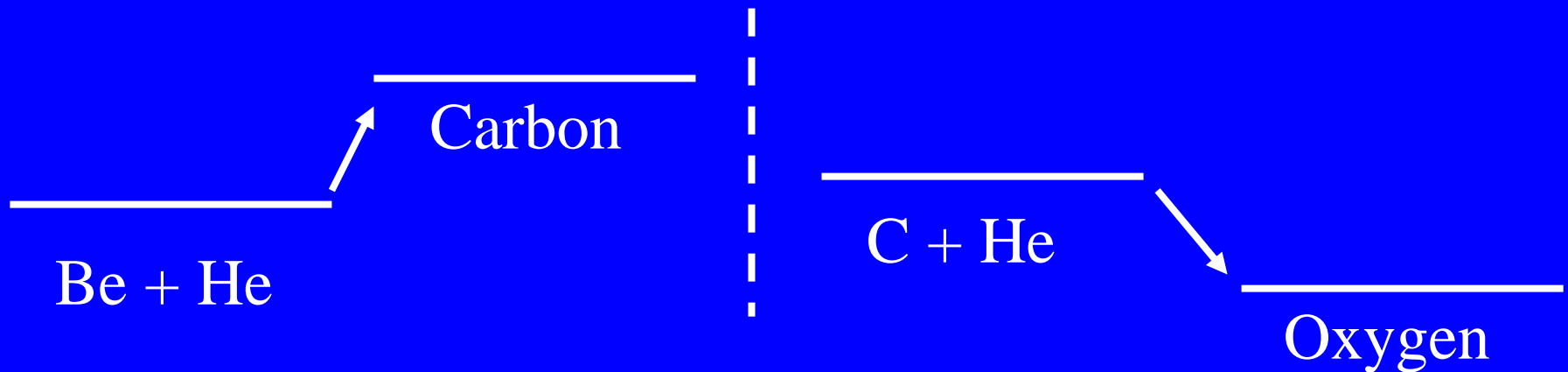
NUCLEOSYNTHESIS: Making heavier atoms by combining lighter atoms. This occurs in stars and is called fusion. This is where stars get the energy to shine.



Elements are made in stars. You are made of the stuff of stars.

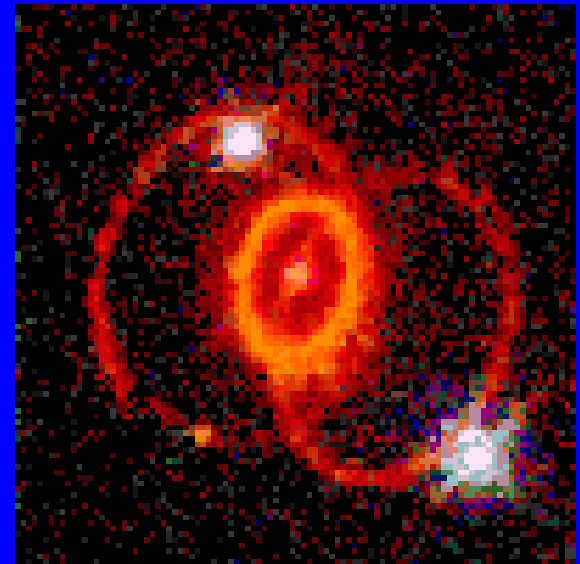
Carbon and Oxygen

We need carbon and oxygen to live. (Carbon dioxide, carbohydrates) The nuclear energy levels determine the rate of production of carbon and oxygen. These levels have been carefully tuned so that both carbon and oxygen are abundant.



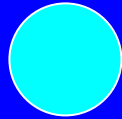
Distance between Stars

Fortunately for us, the average distance between stars is about 3 light years or 20 trillion miles. If stars were 10 times closer (~2 trillion miles), a nearby star could pull the earth into an eccentric orbit and kill life here. If the stars were much farther apart, then there would not be enough heavy elements to make life. Heavy elements (like carbon and oxygen) are the ashes of dead stars and living things need these elements.



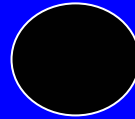
Protons and Electrons

PROTON



(+)

ELECTRON

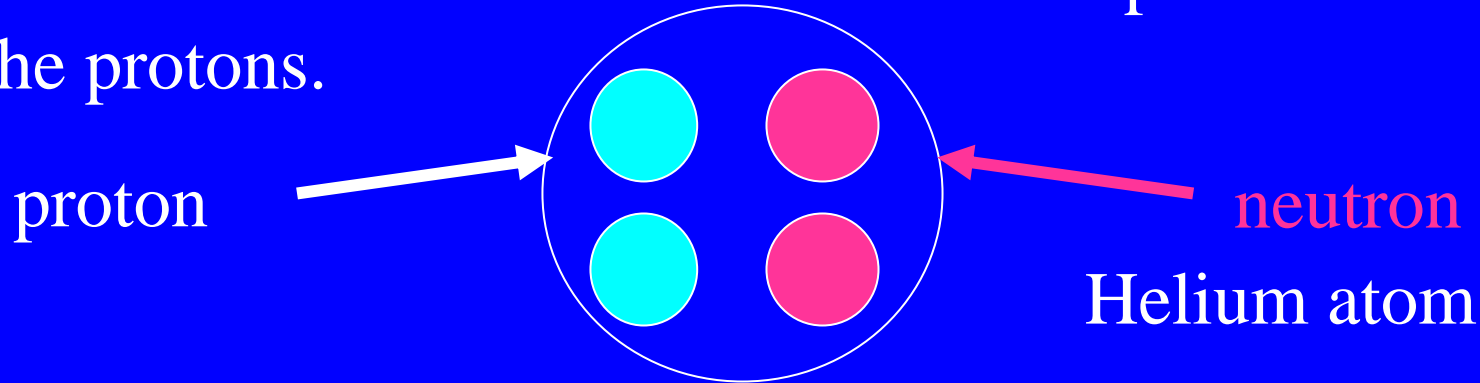


(-)

Protons are positively charged and electrons are negatively charged. A proton is attracted to an electron, but a proton repels another proton, and an electron repels another electron. This repulsion is 10^{39} times larger than gravity. Fortunately the number of protons equals the number of electrons in the universe. If this were not true, the repulsion between the excess protons (or excess electrons) would overwhelm gravity and there would be no stars, or planets, or galaxies.

The Strong Force

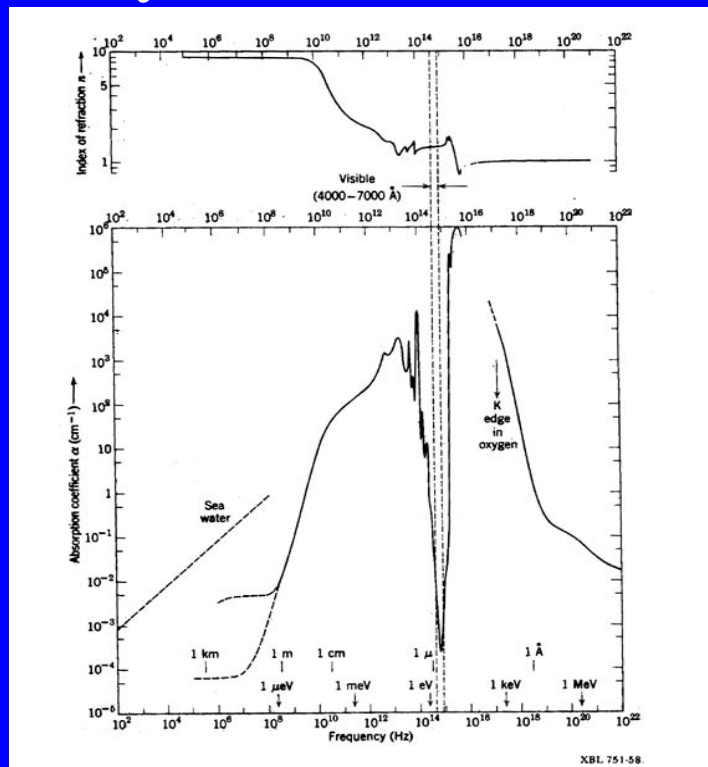
The strong force is the force that holds the protons and neutrons together in the nucleus of an atom. It is just sufficient to overcome the electrical repulsion between the protons.



- If it was much stronger, big nuclei would form. There would be too many heavy elements like lead and iron, and not enough light elements like hydrogen and oxygen. So water would be rare.
- If it was much weaker, it would be hard to fuse hydrogen. Stars wouldn't shine. Heavy elements would be rare.

Water

Water vapor in our atmosphere blocks most of the harmful rays from the sun, e.g., ultraviolet radiation. Fortunately, however, it is transparent to visible light. Otherwise the sky would be dark all the time.



XBL 751-58

Fig. 7.9 The index of refraction (top) and absorption coefficient (bottom) for liquid water as a function of linear frequency. Also shown as abscissas are an energy scale (arrows) and a wavelength scale (vertical lines). The visible region of the frequency spectrum is indicated by the vertical dashed lines. The absorption coefficient for sea water is indicated by the dashed diagonal line at the left. Note that the scales are logarithmic in both directions.

Science and Christianity

Today science and Christianity are often viewed as opposing points of view. However, this was not always the case.

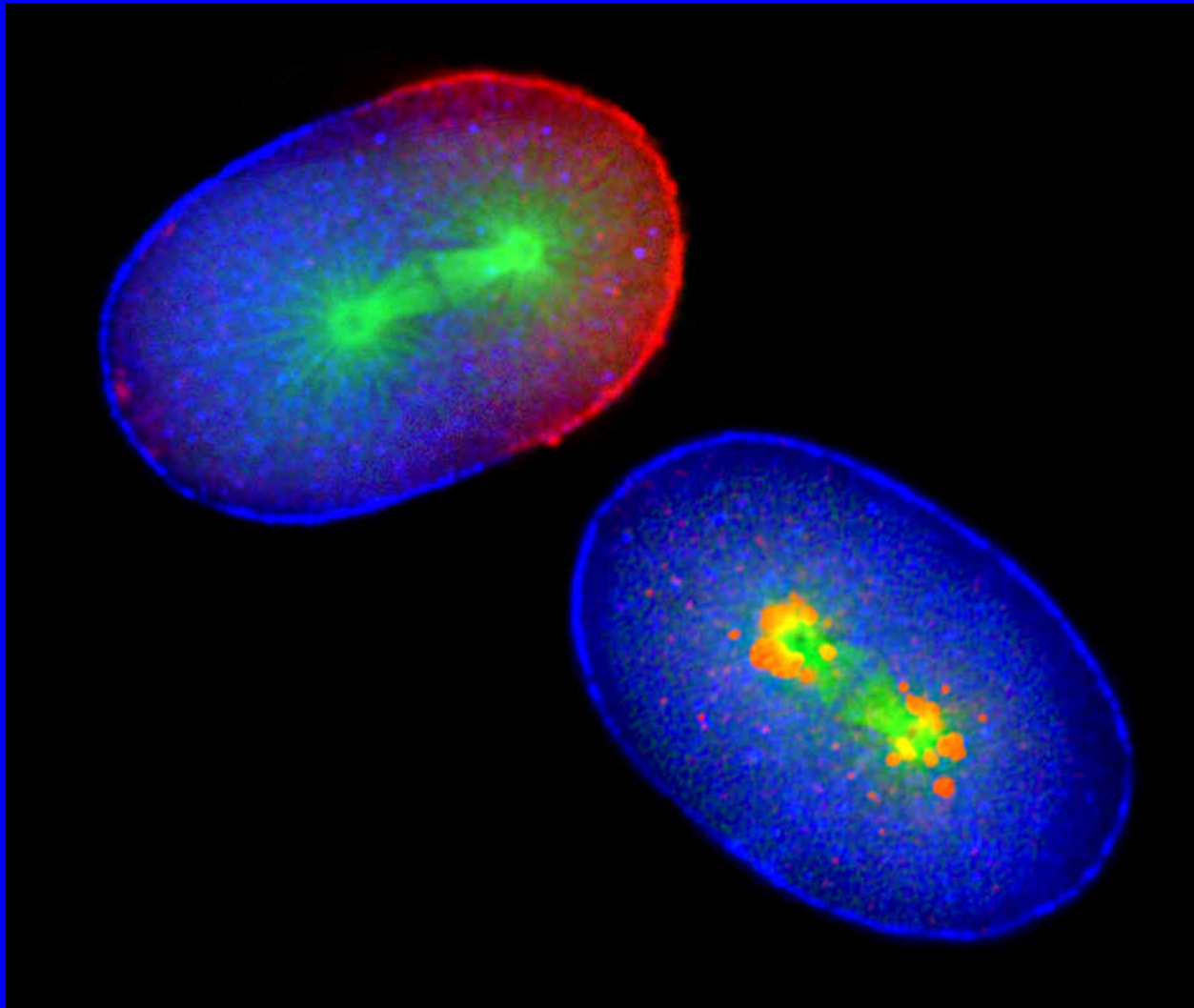
- The scientific method of experimentation arose from the Christian world view that God is rational and unchanging.

Jesus Christ the same yesterday, and today, and forever. – Hebrews 13:8

“Come now, let us reason together,” says the Lord.
– Isaiah 1:18

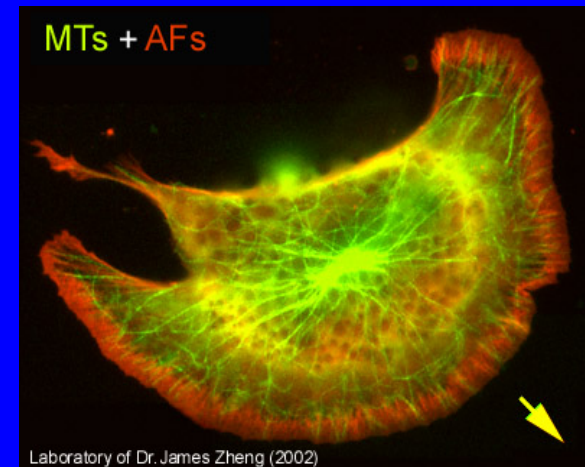
- The laws of physics, chemistry, and biology indicate incredibly intelligent design.

You are “fearfully and wonderfully made”. – Psalm 139:14

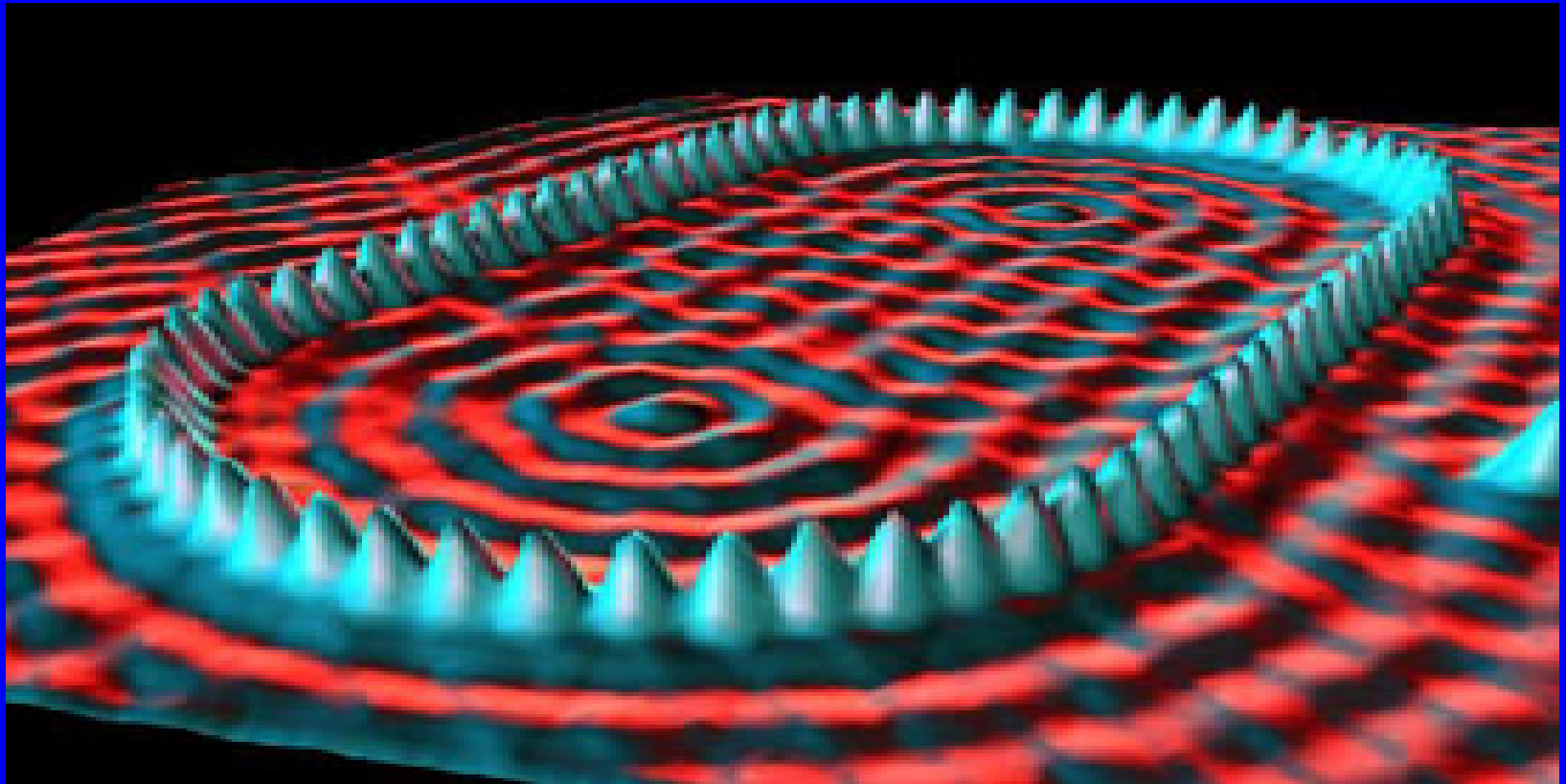


A Cell Is Like a City

- Workers
- Power Plant
- Roads
- Trucks
- Factories
- Library
- Recycling center
- Police
- Post office
- Proteins
- Mitochondria
- Actin fibers, microtubules
- Kinesin, dynein
- Ribosomes
- Genome
- Lysosome
- Chaperones
- Golgi apparatus



STM Image of Individual Atoms



Quantum Corral