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ROCKY MOUNTAIN CREATION FELLOWSHIP

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What's the Matter with Astronomy?

Don DeYoung, Ph.D

Introduction

Space studies indicate that about 95 percent of the physical universe mass is missing and cannot be found. This sounds rather embarrassing; however, we should not be too hard on astronomers. After all, geologists still debate the origin of the Grand Canyon after lifetimes of on-site study, and a naturalistic explanation for the origin of life on earth remains an unsolved mystery. Clearly, there are basic unanswered questions in every branch of natural science. Still, a 95 percent deficit in our basic understanding of the universe is not trivial and is a humbling confession for modern astronomy. The search for dark matter, and now also dark energy, has continued for decades with futile results so far. The following sections explore these two distinct mysteries.

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This is M51, a spiral galaxy about 30 million light years from Earth. The rotation of the outer stars is much faster than predicted by Kepler's 3rd Law (see figure 1). So many assume matter we cannot see is responsible.
Photo from nasa.gov

COVER PHOTO: The Bullet Cluster, formed by the collision of two galaxy clusters. Many believe the arcs (fuzzy areas pointing to the right) are evidence that dark matter truly exists.

COVER STORY: What's the Matter?

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DARK MATTER

This invisible material comprises about 27 percent of the total known mass of the universe. Variations in the percentage depend on particular cosmological models and our number is an average. Dark matter does not absorb, emit or reflect light radiation. It passes directly through ordinary matter and interacts only via gravity. In technical terms, dark matter is distinctly different from normal baryonic matter (neutrons, protons) and leptons (electrons, neutrinos).

There are multiple evidences for the existence of dark matter. Most are embedded in evolutionary assumptions but are included here for completeness. In secular terms, the bottom line is that without dark matter, galax-

ies could not form, exist or behave as we observe.

1. The gravitational attraction of cold dark matter is required to initiate star and galaxy formation following the alleged big bang event.
2. Astronomer Fritz Zwicky showed in 1933 that dark matter is needed to hold galaxy clusters together across the span of deep time.
3. Around 1978, Vera Rubin and Albert Bosma found that the outer portions of galaxies, including the Milky Way, revolve more rapidly than expected. This requires a major component of undetected galaxy mass. The situation would be similar to the outer planets Neptune and Pluto orbiting the sun much more rapidly than actual. The orbital speed of outer stars in galaxies appears

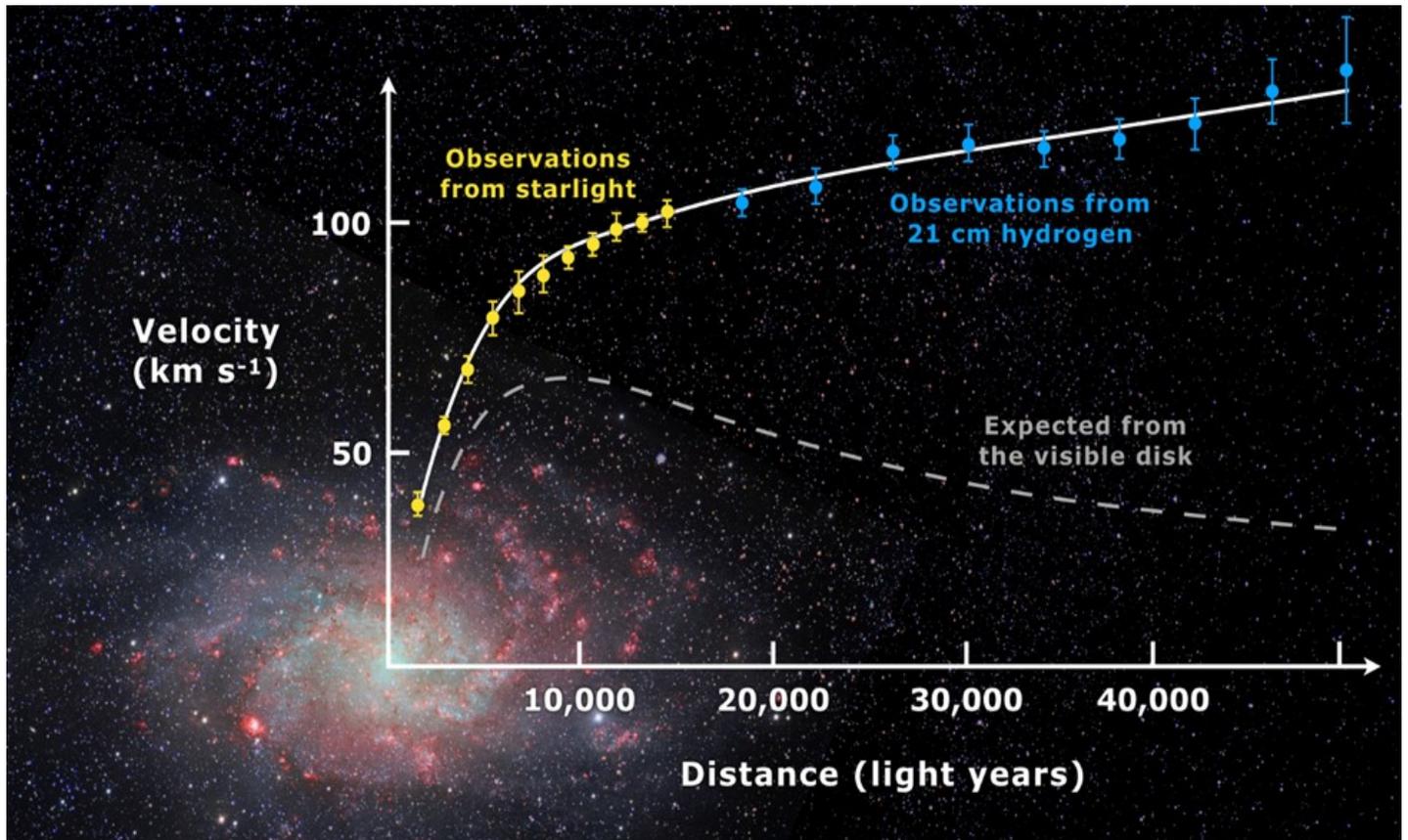


Figure 1. Rotation curve for Messier 33, the Triangulum Galaxy (Wikipedia commons). Orbiting star velocities are plotted against their distance from the galaxy center (upper curve). The lower curve shows the standard prediction for star velocity. For comparison, our sun is about 30,000 light-years from the center of the Milky Way with an orbital speed of about 200 km/sec (450,000 miles/hour).

nearly constant or increasing, implying a vast cloud of dark matter enveloping the Milky Way and other galaxies (Figure 1).

4. The bending and lensing of distant starlight indicates vast clouds of intervening dark matter. The Bullet cluster is singled out as particular dark matter evidence, actually a collision between two galaxy clusters. Gravitational lensing of more distant galaxies appears to result from two invisible dark matter clumps associated with the Bullet cluster.

There is a long list of dark matter candidates, none of them convincing. Each idea has adherents who compete for limited research funds.

1. Countless primordial, mini black holes resulting from the big bang were an initial suggestion for dark matter. However, origin models do not indicate sufficient black hole production to account for the missing mass.
2. Another early suggestion concerns anti-matter formation in the early universe. However, such material would interact with normal matter and produce gamma rays on a grand scale. Such a radiation signature is not detected from space.
3. Other hopeful suggestions for dark matter fare no better including dead stars, unseen planets, or cold gas clouds scattered throughout space.
4. A series of exotic particles permeating space are also hypothesized. WIMPS, or weakly interacting massive particles, are current leading dark matter contenders. However, the Large Hadron Collider, the world's largest particle accelerator located

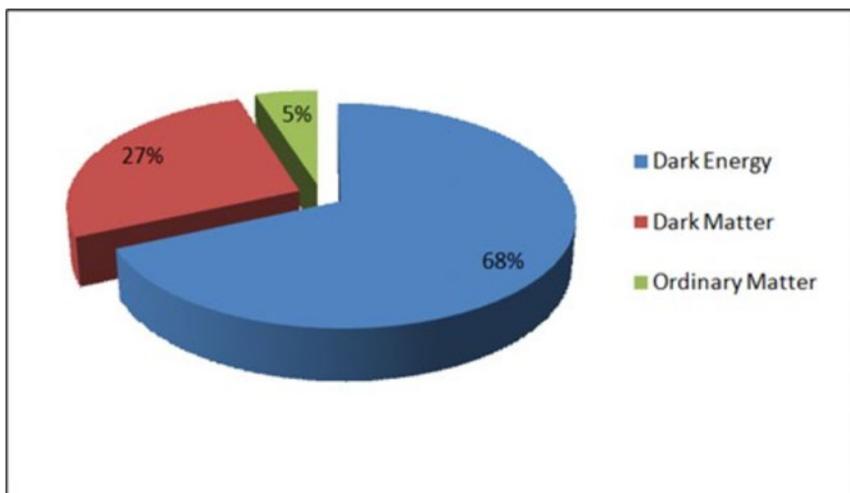


Figure 2. An illustration of the relative amounts of dark energy, dark matter and ordinary matter in the known physical universe.

in Geneva, Switzerland, fails to generate WIMP elementary particles as hoped. The search for WIMP evidence continues with space probes and also in deep mines located around the world. Below ground, shielded from competing radiation, researchers hope to identify WIMP particles passing through the earth. One such particle detector includes a reservoir filled with 50 tons of liquid xenon, giving null WIMP results thus far. Clearly, the search for dark matter is big business.

5. Further ultra-shy dark matter suggestions include machos (massive compact halo objects), axions (named after a laundry detergent!), and several other hypothetical subatomic particles.

Thus far, research tends to show what dark matter is not, rather than what it is. In contrast, in the Biblical creation worldview, the existence of dark matter remains a non-required option. On a 6000-year timescale, even if dark matter does not exist, one would not observe the disintegration of galaxies or galaxy clusters. The scale is simply too large to observe such changes over human history. At the same time, however, in a fully functioning, mature creation worldview, one

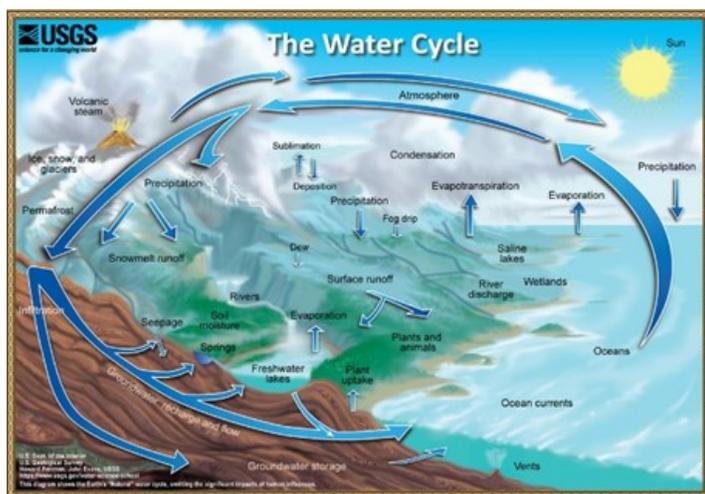
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Gleanings from Genesis

In Genesis 7 and 8 the Bible details the destruction of the earth and virtually all life via a world-wide catastrophic flood. God brought the flood as judgment on a very sinful mankind.

Now the earth was corrupt in the sight of God, and the earth was filled with violence. God looked upon the earth, and behold, it was corrupt; for all flesh had corrupted their way upon the earth. Then God said to Noah, "The end of all flesh has come before Me; for the earth is filled with violence because of them; and behold, I am about to destroy them with the earth." *Genesis 6:11-13*

God then instructed Noah to build an Ark to carry he and his family, along with a sampling of almost every created kind on the Earth, through the deluge. The Earth holds enough water to inundate the entire planet to a depth of 1.7 miles (8,906 feet). Where had God stored all that water and how did He release it to carry out His promised judgment?



Note the image of volcanic steam in the upper left corner.

The Earth was originally created as a ball of water (Gen 1:1-2) and then dry land appeared on the third day of Creation Week (Genesis 1:9-13). In the present age 70% of the Earth's surface is covered by water in the form of oceans, seas,

The Fountains of

By Ed Johlman, RMCF Board M

lakes, rivers, etc. The hydrologic cycle¹ probably ensures that the Earth contains the same volume of water in Noah's day as it does today, but Noah's Earth probably had less surface water. A couple of verses afford clues about the condition of the pre-diluvial Earth:

The LORD God had not sent rain upon the earth . . . but a mist used to rise from the earth and water the whole surface of the ground. *Genesis 2:5-6*

Now a river flowed out of Eden to water the garden; and from there it divided and became four rivers. *Genesis 2:10*

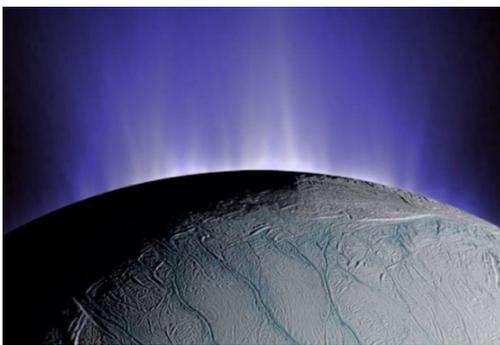
In the six hundredth year of Noah's life, in the second month, on the seventeenth day of the month, on the same day all the fountains of the great deep burst open, and the floodgates of the sky were opened. The rain fell upon the earth for forty days and forty nights. *Genesis 7:11-12*

Genesis 2:10 states the newly created Earth had rivers but Genesis 2:5-6 informs us there was no rainfall. Those verses seem antithetical unless we understand that rivers are fed by a significant volume of ground water.² That is how they continue to flow during periods without rain-

f the Great Deep

Member and Foundations Editor

fall, which is most of the time. In addition, Genesis 2:6 states water used to rise from the earth to water the ground. Though there was no rain there were still large populations of God's created kinds roaming about that needed water to drink. It appears God, in concert with dry land appearing on Creation Day 3, stored underground a significant portion of the water that covered the Earth on Creation Day 1. That water was used to feed the rivers and vegetation.



Enceladus' ice water plumes - yahoo.com

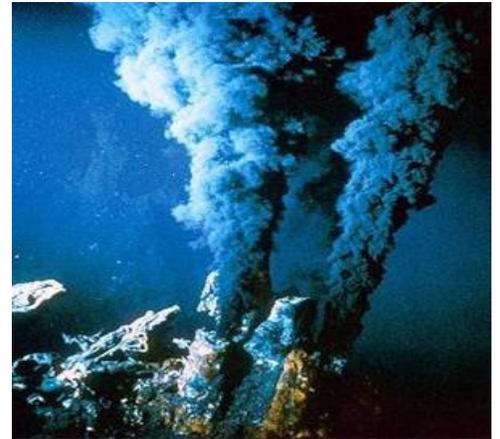


The white patch center-right is the nitrogen field - nasa.gov

Interestingly, that is not without precedent in the rest of our solar system. The Cassini space probe (2008) discovered that Enceladus, Saturn's tiny 310 mile-in-diameter moon, contains massive underground reserves of H₂O that it constantly geysers into space as the source material for Saturn's outer E-ring.³ The New Ho-

izons probe (2015) found a huge nitrogen ice field on Pluto that many believe could cover a huge underground water ocean (photos below).

The likelihood of underground water reserves is further confirmed by the Flood event itself. It is often assumed that God used rain to flood the Earth. The atmosphere holds over 3,000 cubic miles of water (in vapor form). If all of that were to wholly rain down on the Earth it would only cover the ground by about 1 inch.⁴ That process would need only a few hours, not forty days and nights. It is the sequence of Genesis 7:11-12 that tells the true story. First, "the fountains of the great deep



A black smoker - discoverytimes.blogspot.com

BURST (emphasis added) open," and second, "the floodgates of the sky were opened" and the "rain fell" for "forty days and forty nights."

The Hebrew word for 'burst' in Genesis 7:11 is **בָּרַחַ** (*bāqā'*) and refers to an explosive splitting action, bursting from under pressure.⁵ Experts estimate there are more than 1 million underwater volcanos throughout the world.⁶ Five thousand are currently active. Many have seen the spectacular photos of black smokers on the ocean floor (see photo above). In addition,

there are about 1,500 volcanos on the Earth's surface. Five hundred are active with up to 20 usually in current eruption.⁷ The principle output of any surface or underwater volcano is steam. Heat from the earth's core and the weight of surface rock holding the water down can heat underground water to over 1500°F, creating a pres-

GLEANINGS: Fountains

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sure-cooker that is just waiting to explode. Once the water is released into the atmosphere through a volcanic vent, it immediately flashes to steam in a powerful release of explosive energy (“the fountains of the great deep BURST open”). Therefore the Flood was accomplished through erupting springs of super-hot water and steam from up to 1 million underwater and 1,500 surface volcanos.⁸

The Flood was an earth-shaking event. Eruption activity probably continued for up to forty days and forty nights, providing the atmosphere with plenty of water vapor that would cool, condense and fall to the earth as rain (remember the hydrologic cycle). So rainfall was not the primary mechanism of the Flood. It was the result of the primary source of water – volcanism. After the eruptions had run their course, the associated rainfall would have dissipated.⁹ The Biblical description of a major catastrophic event matches precisely what the natural sciences know of the natural processes of our Earth.

¹ Briefly, the hydrologic (water) cycle is the process through which the Earth purifies and replenishes its water supply. Water evaporates into the atmosphere from all over the earth, though the oceans are the key contributor. Warm air at sea level holds more moisture than cooler air at elevation. When air temperatures drop either by being pushed up to higher elevations by wind or by drifting over interior land masses (which are cooler than the oceans), the water vapor will precipitate out in the form of rain. Gravity pulls the rain into the ground where it is purified as it moves through rock and sand. Eventually the interior heat of the Earth heats the water, causing it to rise,

eventually reaching the surface through fissures and cracks that feed the oceans, rivers, lakes, etc. (Remember Old Faithful?). This is a severe abbreviation but the theory is that the water cycle ensures a constant, regular volume of water on the Earth across the ages.

² https://www.usgs.gov/special-topic/water-science-school/science/rivers-contain-groundwater?qt-science_center_objects=0#qt-science_center_objects

³ Enceladus’ icy eruptions serve as evidence of a young universe. How could a 310-mile-in-diameter moon feed Saturn’s E-ring, which is 186,000 miles across, over billions of years? It cannot. But it might work for a few thousand years.

⁴ https://www.usgs.gov/special-topic/water-science-school/science/how-much-water-there-earth?qt-science_center_objects=0#qt-science_center_objects and <https://whyfiles.org/2010/how-much-water-is-in-the-atmosphere/index.html>

⁵ Theological Wordbook of the Old Testament by Harris, Archer & Waltke as published by Logos Bible Software.

⁶ <http://volcano.oregonstate.edu/submarine>

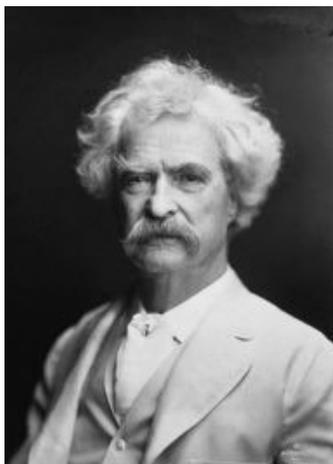
⁷ https://www.usgs.gov/faqs/how-many-active-volcanoes-are-there-earth?qt-news_science_products=0#qt-news_science_products

⁸ It is unlikely all of them erupted during the flood. Many erupted post-flood and were instrumental in ushering in the Ice Age. That is a subject for another time.

⁹ Some believe that Genesis 1:7 describes an upper-atmosphere band of water that encircled the Earth, a ‘vapor canopy,’ and that the rainfall of Gen 7:11-12 is a result of its collapse. I believe both concepts are unlikely for several reasons and that volcanism alone as described in this article was the source of all the flood waters.



Ed Johlman has been active in creation work since the mid-1990’s, getting started with the Creation Science Association of Mid-America in Kansas City, MO, and then RMCF since 2000. He has led outdoor safaris to locations such as Picketwire Canyon, Dinosaur National Monument, Arches and Yellowstone National Parks. He is an RMCF Board Member and has served as Editor of FOUNDATIONS since 2018. He works as a hospital CFO in Colorado.



“There is something fascinating about science. One gets such wholesale returns of conjecture out of such a trifling investment of fact.”

- Mark Twain, from *Life on the Mississippi* (1883), commenting on the ancient ages for the earth proposed by geology.



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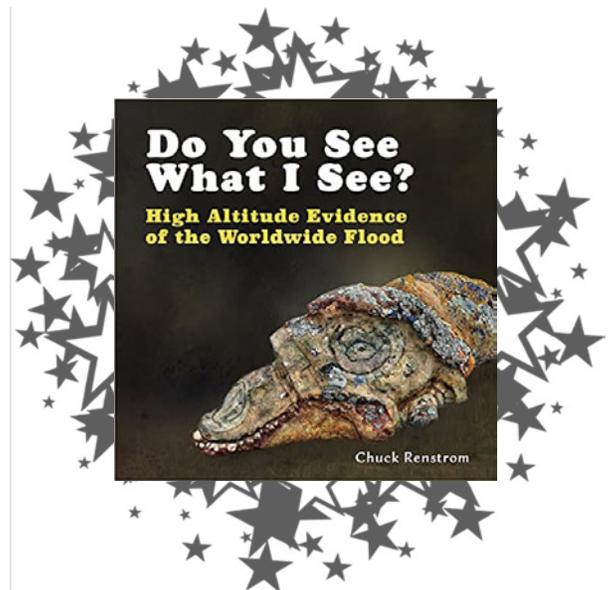
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COVER STORY: What's the Matter?

Continued from page 5

might expect that some form of dark matter exists for physical stability across the cosmos.

DARK ENERGY

Our second fundamental astronomy mystery involves the expanding universe. Edwin Hubble first measured this expansion around 1925, nearly a century ago. Most creationists accept this interpretation of data, concluding that God created the universe with a continually expanding nature. It appears that space itself expands, somewhat like a stretching rubber fabric. Distant galaxies are imbedded in this space and are carried outward, diverging from one another. This situation actually leads to a stable universe. If the universe was static and non-expanding, gravity would then dominate and galaxies subsequently would collapse inward toward an eventual "big crunch."

There are exceptions to the expanding universe in our vicinity of space. The Andromeda Galaxy, for example, about 2.5 million light years distant, is part the "local group" of 30-50 galaxies including the Milky Way. Gravity attraction overcomes space expansion and the Andromeda Galaxy is approaching the Milky Way at nearly 700,000 miles/hour with respect to the sun. In 1998, our understanding of universe expansion became even more interesting. Astronomers Saul Perlmutter, Adam Riess and Brian Schmidt received the physics Nobel Prize for showing that far distant supernovae are moving outward more slowly than the nearer ones. The secular interpretation is that about 7.5 billion years ago, the expansion of the universe speeded up for un-

known reasons. Evolutionary deep time is embedded in this data interpretation; however, the Doppler redshift of light does show the relative speed discrepancy between near and far space objects. The data centers on a particular group of supernovae, called Type 1A, which result from white dwarf interactions with binary neighbors. These supernovae have a well-known brightness, called a standard candle which allows accurate distance measurements.

The conclusion is that some unknown factor or force, arbitrarily called dark energy, causes a speedup in universe expansion. This mystery factor repels matter outward, the opposite effect of gravity which always attracts. Current estimates attribute about 68 percent of the physical universe mass to this unknown entity. Dark energy may be literal mass (m) or pure energy (E); the two are interchangeable by the relation $E = mc^2$ where c is light speed. Note that the estimated percentages for dark matter and dark energy, 27 and 68, lead to the total 95 percent mystery mass which overwhelms ordinary visible matter.

As with dark matter, there is no shortage of explanations suggested for dark energy.

1. In the sub-microscopic quantum world, it is known that virtual particles spontaneously form and annihilate continually, even in a perfect vacuum. That is, there is a 'frothiness' of transient particle activity in empty space. The Casimir effect shows that these virtual particles are real and produce measurable force and pressure. However, this quantum or vacuum energy source is far, far too small to account for the observed acceleration of space.

2. The apparent speedup of expansion may simply be an unknown property of space. It is certainly true that we know little of the details of deep space. For example, some suggest that an unknown dynamic fluid or energy permeates all of space. Some call it quintessence, the ancient Greek name given to a fifth state of matter beyond the traditional four (earth, water, air, and fire).
3. An alternate view is that a modified theory of gravity is needed beyond its familiar inverse square nature. The current understanding of gravity serves us well, at least on the scale of the solar system. The challenge is to fit a major revision of gravity into our familiar observations, from falling objects to satellite orbits.

CONCLUSION

Three comments follow from our discussion of dark matter and dark energy. First, in the Biblical creation worldview, neither quantity is essential; they may or may not exist. The recent, supernatural creation is filled with endless variety which may well include pervasive dark matter and dark energy, perhaps in the form of deep space variations in the familiar gravitational force.

The second comment is a reminder of the tentativeness of all science understanding, and space in particular. Secular astronomers lack insight for many basic assumptions. For example, how and why did the alleged big

bang occur in the first place? An initial inflation episode is required to explain the data, so why and how did this event occur? How do the physical constants and dependable laws of nature originate? Furthermore, why is no evolved life detected elsewhere in space?

As a third comment, consider the majestic verse Colossians 1:17, "He [Christ] is before all things, and in him all things hold together." These words make clear that, at some basic level, the spirit world interfaces with the physical universe. Whether or not sources are found for dark matter and dark energy, a credible suggestion is that the universe exists and holds together by the Creator's hand. And if He should turn away from His creation for one instant, chaos surely would result. Thanks be to the Creator for an amazing universe filled with treasures and mysteries.



Don DeYoung is Chairman of the Department of Physical Science at Grace College, Winona Lake, Indiana, and has taught at Grace since 1972. He has taught physics, astronomy and mathematics. He speaks on creation topics and believes that the details of nature are a powerful testimony to the Creator's care for mankind. Dr DeYoung earned his Ph.D at Iowa State University and his Masters in Divinity at Grace Seminary. He is on the faculty of the Institute for Creation Research, San Diego. Dr DeYoung and his wife Sally have three married daughters. In their local church, Don is a Sunday school teacher, elder and member of the Warsaw Christian School Board. He authored eight books on Bible-Science topics and has published articles in The Journal of Chemical Physics and the Creation Research Society Quarterly.



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FOUNDATIONS JULY/AUGUST 2021

For in six days the LORD made
the heavens and the earth,
the sea and all that is in them.
Exodus 20:11

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RMCF FRIDAY NIGHT MEETINGS ARE BACK!!

7pm at the Littleton Baptist Church, 1400 W Caley, Littleton, CO

August 13, 2021



Ed Johlman

FOUNDATIONS Editor, RMCF Board Member

Whatever Happened to Noah's Ark?

Have you wondered what became of Noah's Ark after it landed in the "mountains of RRT?" Join the club! Could it have really landed on top of Mount Ararat, or did it land somewhere else? Is it possible to actually find it today? Find out on the 13th!

September 10, 2021



Barbara Helmkamp, Ph.D Physics

Polonium Halos: Time, Temperature, Miracle

Radiohalos are found in granites all over the world, intrusive granites that cut through fossil-bearing sedimentary rock as well as coalified wood. Halos cannot survive temps above 150°C or a molten state. How do these microscopic miracles form through great heat and then cool rapidly enough to allow the halo to be preserved? Their existence has more to say about processes during the Flood year than during Creation Week. Come learn more!

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