THE MATTER OF DARK MATTER

By Johnny R. McCarty

Up to 99% of the universe is missing! It is urgent that we find it! Have you seen it?

If dark matter does exist, it has vastly more mass than the "visible" part of the universe. Only about 4% of the total mass in the universe (as inferred from gravitational effects) can be seen directly. About 22% is thought to be composed of dark matter. The remaining 74% is thought to consist of dark energy, an even stranger component, distributed diffusely in space, which probably cannot be thought of as ordinary particles. Determining the nature of this missing mass is one of the most important problems in modern cosmology and particle physics. Its urgency is underlined by David B. Cline in a 2003 article in Scientific American, in which he writes: "The terms . . . 'dark matter' and 'dark energy,' serve mainly as expressions of our ignorance."

Gravity: the Great Organizer

According to current theory, minute fluctuations in cosmic background radiation detected by NASA's Cosmic Background Explorer (COBE) were all that was necessary to seed the structures which would later become galaxies, galaxy clusters, even superclusters. But how did those primordial fluctuations detected by COBE become the gigantic structures we see today?

"Those teeny tiny fluctuations led to the incredible array of structures that we see around us now...radio galaxies, stars in the galaxies, clusters of galaxies, voids, filaments, the whole lot...great walls, you heard of it. And the question was, how?" (Jeremiah Ostriker, Princeton University).

The answer lies with gravity, which, by the time radiation and matter parted ways, had become the dominant long-range force in the universe. But there must have been enough matter to have generated the gravity that could pull together the giant structures, which populate the modern universe.

"Was it only gravity that did it? If it was only gravity, what was the gravity acting on? Just ordinary gas and material that we know of? Was there some exotic material--dark matter? If it was exotic material, what kind of exotic material?" (Jeremiah Ostriker, Princeton University).

The Omega Factor

The large scale geometry of the universe is governed by Einstein's General Theory of Relativity. Einstein showed that gravity curves three-dimensional space, and that space in turn moves matter. For the universe as a whole, the shape of the curvature depends on the average density of the matter.

If the average density of matter in the universe is greater than the critical density, the force of gravity will eventually rein in expansion and cause the universe to collapse upon itself. In this case, the universe is said to be positively curved, and **Omega, the ratio of the average density to the critical density**, is greater than 1.

Conversely, if the average density of matter in the universe is less than the critical density, gravity will lose its grip on matter and the universe will expand forever. This negatively curved universe is defined by an Omega less than one.

If Omega is exactly one--that is, if the average density of the universe is equal to the critical density--then the universe will expand to a maximum density and remain there for eternity. This universe is flat; it has zero curvature.

The **inflationary** hypothesis, when applied to the standard Big Bang model of cosmology, implies that the average density of the cosmos is very close to or exactly matches the critical density required to balance its expansion.

In other words, Omega equals one. But when all the visible matter is added together, the resulting density is but 5 percent, at most 10 percent of the critical density. Where, and what, is the missing matter?

And then there are the relative motions of galaxies, galaxy clusters and giant superclusters to reckon with. The speeds at which the Milky Way and our nearest neighbor, Andromeda, are **rotating** demand some extra, unseen matter--otherwise they would simply fly apart. Not only that, but our Local Group of galaxies and the Virgo cluster are hurtling toward some great, unseen **"Great Attractor"** at more than one million miles per hour!

For decades, astronomers have tried to explain the stupendous velocities they observe. The objects in question simply don't contain enough visible matter to account for the gravitational forces needed to generate these motions.

Clearly **there's more out there than meets the eye**. That "something," cosmologists believe, is dark matter. No one quite knows what it's made of, but it seems to comprise at least 90 percent of what's out there!

Rotations to Reckon With

In 1687, Sir Isaac Newton showed that the force of gravity between two celestial bodies increases as the product of their two masses and decreases as the square of the distance between them. Because of their gravita-

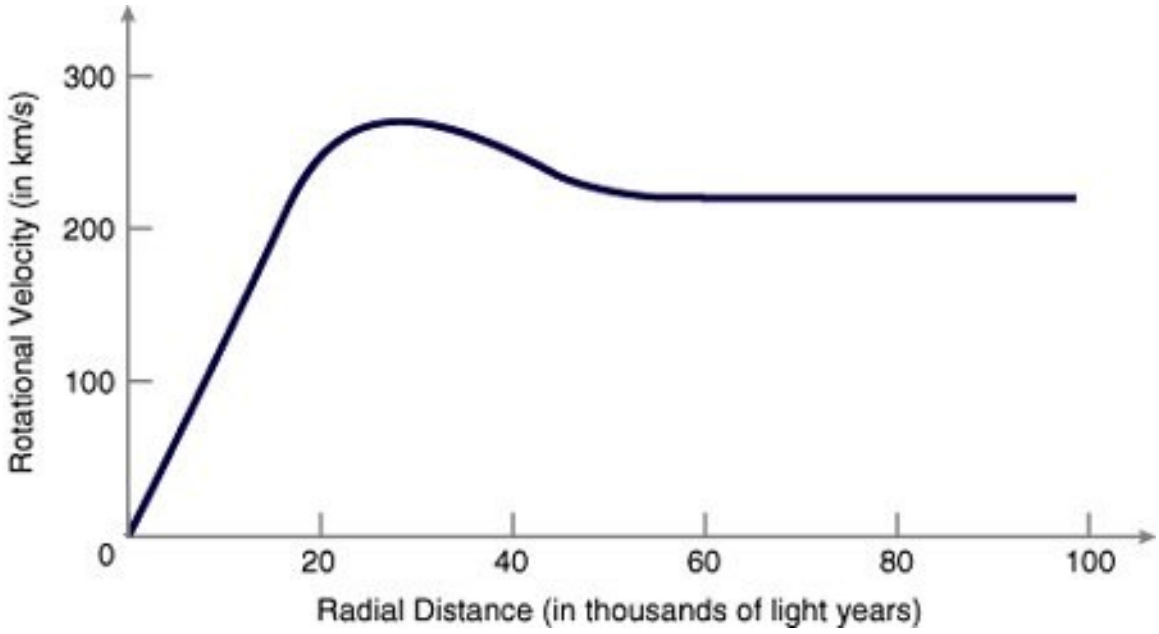
tional attraction to the Sun, the earth and all the other planets in our solar system rotate around the Sun. But while the earth moves completely around the sun in just one year, Pluto, normally the outermost planet in the solar system, takes 249 years to do the same--even though its orbital path is only 40 times that of earth's. Spiral galaxies, such as our own Milky Way and our nearest neighbor Andromeda, similarly rotate around a galactic center. Spiral arms twist around a central bulge; farther away from the center is the halo of the galaxy, seemingly sparsely populated with scattered clusters of stars.

1 Andromeda Galaxy
Also known by astronomers as "M31," Andromeda is our Milky Way's nearest galactic neighbor. Lying about 2 1/4 million light years away, both Andromeda and the Milky Way, along with 20 smaller galaxies, belong to the " Local Group" of galaxies. Note the two smaller satellite galaxies above and below Andromeda. Galaxy M31 image by Jason Ware.

Newton's law predicts that the movement of stars around the galactic center should slow down with increasing distance from the center of the galaxy. But scientists noticed a funny thing when studying the movement of star clusters in Andromeda's halo. Astrophysicists measure the velocities of distant objects by measuring the "Doppler shift" of an object. Objects whose characteristic wavelengths are shifted to the red end of the spectrum are moving away from the observer; those whose wavelengths are blueshifted are moving toward the observer. To measure the relative speed of two distant objects--say a star in one of Andromeda's spiral arms and a star in Andromeda's halo--scientists measure the **difference** between their redshifts or blueshifts.

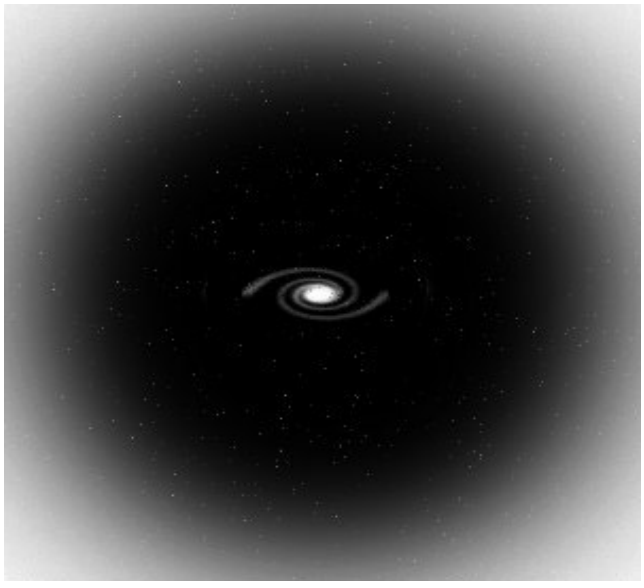
Much to the surprise of the scientists who made the initial measurements, the rotational velocity of stars in Andromeda did not steadily drop off in the outer reaches of the galaxy. Instead, the speeds drop slightly and then level off at a constant value.

2 Rotation Graph for Andromeda



Scientists found similarly puzzling results when they put together rotation graphs for the Milky Way and other spiral galaxies. How could this be?
If Newton's law is to hold true--and scientists have no reason to believe it doesn't--there must be large quantities of mass that we can't see in the halos of spiral galaxies. This so-called **dark matter** must provide the gravitational pull that keeps the stars in the outermost reaches of the galaxies whirling around so quickly.

Dark Matter Halo
Moreover, theory implies that the thin, rotating disks that are spiral galaxies are simply not stable enough to hold together on their own gravitational force; disruptive vibrations would cause them to fly apart. If, however, spiral galaxies are embedded in a halo of dark matter, they become stable.

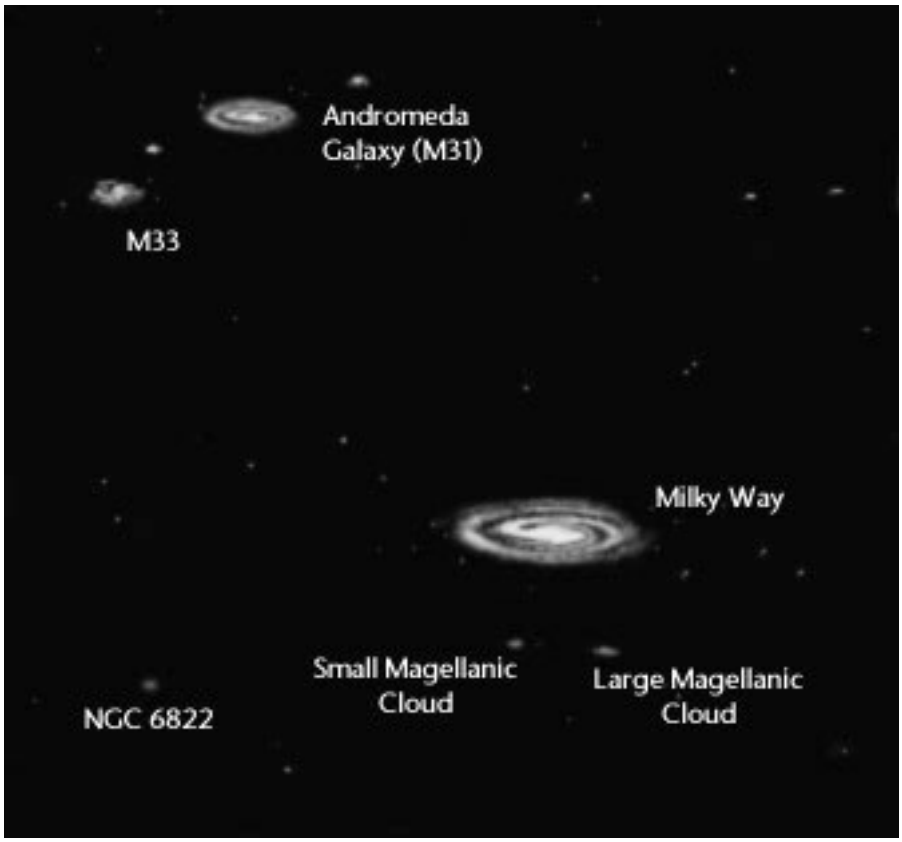


3 Dark Matter Halo

The question again becomes: what is this dark matter?

The Great Attractor

The Milky Way and Andromeda galaxies are the dominant structures in a galaxy cluster called the Local Group, which is, in turn, an outlying member of the Virgo supercluster. Andromeda--about 2.2 million light-years from the Milky Way--is speeding toward our galaxy at 200,000 miles per hour.



4 Local Virgo Group

This motion can only be accounted for by gravitational attraction, even though the mass that we can observe is not nearly great enough to exert that kind of pull. The only thing that could explain the movement of Andromeda is the gravitational pull of a lot of unseen mass--perhaps the equivalent of 10 Milky Way-size galaxies--lying between the two galaxies.
Furthermore, our entire Local Group is hurtling toward the center of the Virgo cluster at **one million** miles per hour!

The Virgo cluster lies some 50 million light years from Earth. Only the central region is shown above, containing two giant elliptical galaxies, M84 and M86. The visible part of the cluster is but a small portion of what seems to be out there. Nevertheless, the Virgo Cluster, along with several other large clusters, are in turn, speeding towards a gigantic unseen mass named **The Great Attractor**.

Virgo Cluster

5 Virgo Cluster

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Based on the velocities at these scales, the unseen mass inhabiting the voids between the galaxies and clusters of galaxies amounts to perhaps 10 times more than the visible matter.

Even so, adding this invisible material to luminous matter brings the average mass density of the universe still to within only 10-30 percent of the critical density needed to produce a "closed" or positively curved universe.

Can We Measure the Curvature?

In principle, cosmologists can determine the curvature of three dimensional space by using volumes rather than areas. Unfortunately, geometric methods have proven impractical because they rely on a uniform distribution of galaxies throughout the universe, which does not evolve with time--assumptions which are false since observations indicate that the galaxies have a finite age and have changed over the eons.

Back to Omega

Consequently, cosmologists attempt to infer the curvature by measuring Omega--not a trivial task, as it turns out. All of the luminous matter in the universe--everything that can be detected through telescopes--adds up to only one half of one percent of the critical density, or Omega = 0.005. But there is a lot of dark matter--perhaps in the form of black holes, dwarf stars, or exotic particles--in the universe. How do we know it's there?

Just like the wind, we can't see dark matter, but we can see its effects. By exerting its gravitational influence, dark matter affects the motions of stars and gases in nearby galaxies, and on the motions of galaxies and galaxy clusters themselves. Cosmologists analyzing these motions have come up with Omega values of 0.1 to 1.

Inflation theory predicts Omega to be exactly 1, implying that the universe is flat, or has zero curvature. Whereas a positively curved universe is finite (like the surface of a sphere), both negatively curved and flat universes extend forever. Therefore, if Omega really is 1 throughout the cosmos, then the universe we inhabit is infinitely large, which means we can see only an infinitesimally small fraction. No wonder we've detected so little matter in the universe!

Might the universe be "open" after all? Cosmologists continue to debate this question, just as they are also trying to figure out the nature of the missing mass, or "dark matter."

More than Meets the Eye

What is Dark Matter Made Of?

Inflationary theory predicts that the universe is flat--that the average density of matter in the universe exactly equals the critical density required to close the universe. The matter that we can see is, at most, 10 percent of the critical density. And, even if inflation is not correct and we do indeed live in an "open universe," there's still a lot of unseen matter out there. This unseen matter, called **dark matter** because it does not reflect light,

keeps spiral galaxies from flying apart and moves galaxy clusters and even superclusters in a great path across space.

Baryonic Dark Matter

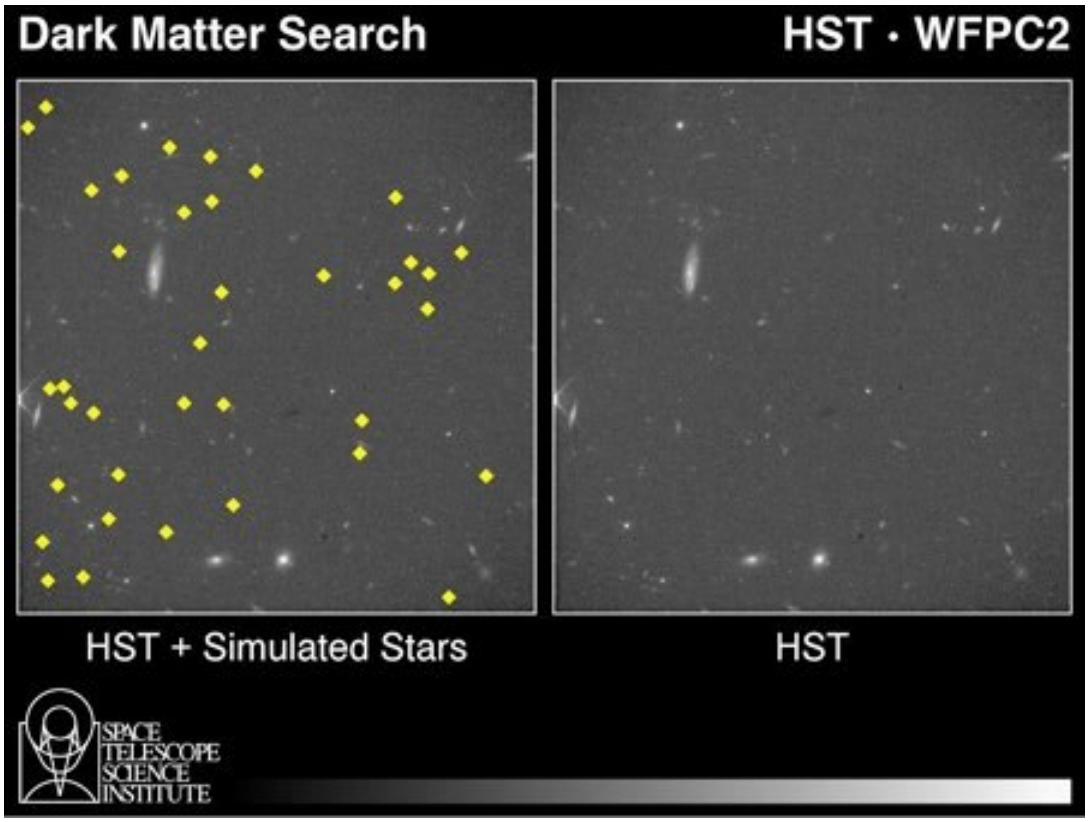
Particle physicists and astrophysicists continue to speculate on the nature of dark matter. Some dark matter may simply be ordinary, or "baryonic," matter made of protons, neutrons and electrons that fails to emit radiation detectable on Earth.

One source of baryonic dark matter is the recently discovered primordial helium. The helium, along with the hydrogen that almost surely accompanies it, is scattered throughout the intergalactic medium. Scientists estimate that this primordial matter equals or exceeds all of the baryonic matter previously accounted for.

Other candidates for baryonic dark matter have been dubbed **MACHOs** (**Ma**ssive **C**ompact **H**alo **O**bjects), which may include small, dim stars called red dwarfs, Jupiter-size planets that don't initiate nuclear reactions, and even black holes. A team of astronomers using the world's most powerful telescope, the Keck Observatory in Hawaii, recently made the first confirmed sighting of a brown dwarf, an exceedingly dim object somewhere between a planet and a star in size.

Missing Red Dwarfs

But astronomers using NASA's Hubble Space Telescope detected a paltry number of red dwarfs in the Milky Way's halo. They've ruled out red dwarfs as significant contributors to the dark matter in the Milky Way and, by extension, other galaxies.



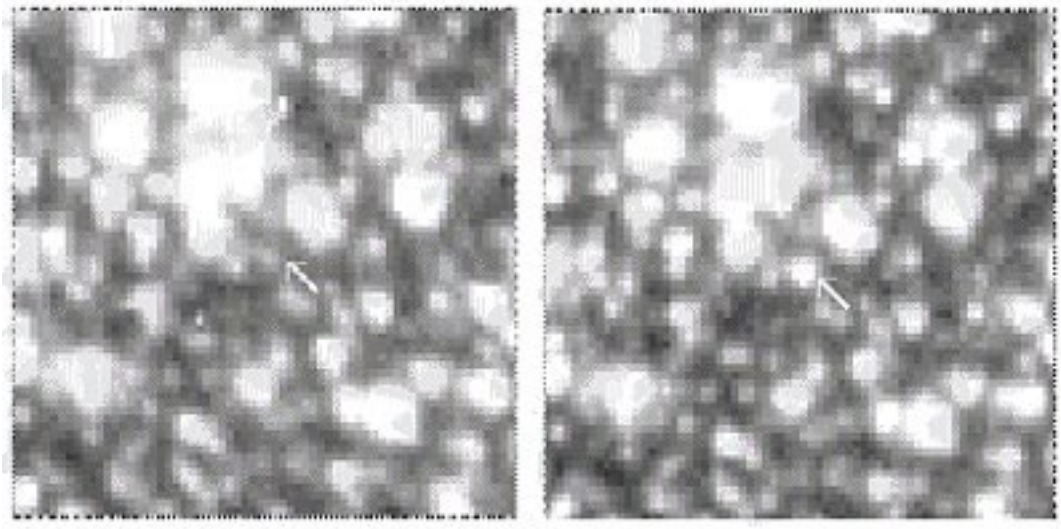
6 Missing Red Dwarf Stars

Left: A NASA Hubble Space Telescope image of a randomly selected area of sky taken to search for faint red stars that might constitute dark matter in our Milky Way Galaxy. (Dark matter is material of an unknown type that makes up most of the mass of our galaxy.) If the dark matter in our galaxy was made of faint red stars -- as many scientists have previously conjectured -- then about 38 such stars should have been visible in this HST image. The simulated stars (diamond-shaped symbols), based on theoretical calculations, illustrate what scientists would have seen if the dark matter were locked-up in faint red stars. These surprising results rule out dim stars as an explanation for dark matter in our galaxy.

Right: The unmodified HST image shows the region is actually so devoid of stars that far more distant background

galaxies can easily be seen. The field is in the constellation Eridanus, far outside the plane of our Milky Way Galaxy. This region was chosen to highlight stars in the galactic halo, where dark matter exists, and to avoid the contribution of faint stars in the plane of the galaxy.
Technical Information: The image was constructed from seven exposures totaling almost three hours of searching by HST. The field shown is about 1.5 arc-minutes across. The image was taken in near-infrared light (814 nm) with the Wide Field Planetary Camera 2, on Feb 8, 1994. This observation is part of the HST parallel observing program.
Credit: J. Bahcall, Institute for Advance Study, Princeton and NASA Courtesy Space Telescope Science Institute (STScI) PHOTO RELEASE NO.: STScI-PRC94-41a © STSCI/NASA

Scientists using powerful land-based telescopes are using a technique called "gravitational lensing" to detect MACHOs in the Milky Way. Einstein's General Theory of Relativity shows that the fabric of spacetime is warped around massive objects; any light passing through that warped spacetime should therefore be bent. MACHOs could act as gravitational lenses by diffracting the light rays from more distant objects as they journey to the earth.



7 MACHO Observation (OGLE microlensing event

This pair of images presents two 30 by 30 arcsec subframes centered on the OGLE (Optical Gravitational Lensing Experiment) event #2, taken at minimum (left) and maximum (right) brightness. Time scale for the observations is 45 days.
The Optical Gravitational Lensing Experiment (OGLE) is a long term observational program with the main goal to search for dark, unseen matter using the microlensing phenomena. The idea of employing microlensing for that purpose was originally proposed by Paczynski (ApJ, 304, 1; ApJ Letters, 371, L63). The Magellanic Clouds and the Galactic Bulge are the most natural locations to conduct such search due to a large number of background stars that are potential targets for microlensing. The LMC and SMC stars may be lensed mostly by the Galactic halo objects, in case of the Galactic Bulge stars one expects an additional component -- microlensing by low-mass disk stars. In both cases the optical depth for microlensing is very small -- about 10^-6. Therefore a massive, long term survey must be conducted to a) detect and b) collect statistatically significant sample of microlensing events to draw any conclusion about the nature of dark matter. The OGLE project started in 1992 and the Galactic Bulge has been selected as the first target. Observations are carried out at the Las Campanas Observatory, Chile which is operated by the Carnegie Institution of Washington. So far twelve microlensing events have been found in the direction of the Galactic Bulge including one event most likely caused by a binary lens. You can find more info about these events here:
Courtesy of Bohdan Paczynski, Princeton University; Andrzej Udalski, Warsaw University

Astronomers focusing on gravitational lensing effects from stars in the Large Magellanic Cloud--a galaxy in the Local Group--detected very few MACHOs in the halo of the Milky Way but, surprisingly, more than expected in the center. Still, there don't seem to be enough MACHOs to account for the internal motions and relative velocities of galaxies.

Non-baryonic Dark Matter

Cosmologists are exploring another possible source of dark matter: exotic, non-baryonic particles. These parti-

cles come in two flavors: **cold dark matter** and **hot dark matter**. Cold dark matter refers to extremely massive particles that move very slowly. These particles have been dubbed **WIMPs** (Weakly Interacting Massive Particles) by physicists, who seem to never miss an opportunity for a joke. Scientists have postulated the existence of **photinos**--partners of photons--with an expected mass 10 to 100 times that of a proton; **axions**, carriers of force that have mass, or even **quark nuggets**, odd non-baryonic aggregates of quarks. None of these particles have been detected, either in space or in particle accelerators.

Hot dark matter, on the other hand, is made up of lightweight particles that move near the speed of light. One of the most likely candidates is the **neutrino**. Previously thought to possess no mass, recent experiments indicate that some types of neutrinos may actually have between one million and one thousandth the mass of an electron. Now, that's a mighty tiny particle, but our universe is absolutely swarming with neutrinos created during the great matter-antimatter annihilation that took place shortly after the Big Bang. If they do indeed have mass, they could easily account for the "missing" dark matter necessary for a flat universe.

Clues from the Computer

Even though we don't know what forms dark matter takes, scientists are convinced it exists. If it didn't, present assumptions about the origin and fate of the cosmos would fall apart.

Supercomputer simulations of the formation of galaxies and clusters rely on educated guesses about the nature and amount of dark matter. By trying to simulate observed structures, cosmologists learn more not only about how galaxies form, but also what amounts and types of dark matter are needed to explain cosmic evolution.

Clearly, though, dark matter -- what it is and how prevalent it is in the universe -- remains one of cosmologies greatest unsolved mysteries.

Looking In the Right Direction

Cosmologists freely admit their ignorance. For all of their intellectual capacity, intricate and powerful instruments, and vast monetary expenditures, they are no closer to explaining the nature of the universe than we were over 5,000 years ago. The reason for this failure is simple: they are looking the wrong way. By examining the visible universe they are only able to come to one conclusion: it exists. Yes, man can deduce many of the laws by which the physical universe operates but only to a certain level. Go much beyond the atomic level in smallness and our knowledge becomes more and more theoretical. The same goes for going much beyond the solar system size in the other direction.

Even some of the most common forces within that environment elude us. We still do not know the exact nature of electricity or gravity. We can observe their effects and use them to a limited degree but are completely ignorant of their true nature.

His Word Is Truth

If the cosmologists and particle physicists would simply open the most abundant book on the earth, they would find the answers to all of their questions.

"In the beginning was the Word, and the Word was with Elohim, and the Word was Elohim. He was in the beginning with Elohim. All things were made through Him, and without Him nothing was made that was made. In Him was life, and the life was the light of men. And the light shines in the darkness, and the darkness did not comprehend it," (John 1:1-5).

Here, the Creator tells us how and through whom He created the universe. The trouble is, that too many of us either don't listen or don't believe. His Word is filled with the knowledge of the creation.

Yahweh also explains that Yahshua, the Word, through whom He created all things, continues to uphold and sustain the universe by that same Word. "Who being the brightness of His glory, and the express image of His person, and upholding all things by the Word of His power, when He had by Himself purged our sins, sat down on the right hand of the Majesty on high," (Hebrews 1:3). Yes, at this very instant Yahshua maintains the universe by the express power of His word.

"For the invisible things of Him from the creation of the world are clearly seen, being understood by the things that are made, even His eternal power and supernal nature; so that they are without excuse," (Romans 1:20).

Read that again! Yahweh inspired to be written that these "invisible things" that the scientists are so desperately seeking are understood by the things He allows us to see. By applying their observations to the Word of Yahweh, they would quickly come to realize that there was really nothing "missing" from the universe. They would be able to understand the nature of what they call "dark matter" or "dark energy."

They would realize that the real universe is like an iceberg. Over ninety percent of it can't be seen because it is composed of spirit. Like the earthly Tabernacle Moses was instructed to make, the physical universe is a mere "shadow" of the real universe. What we can't see or detect is the "matter" and "energy" of the spiritual (heavenly) universe of Yahweh's throne.

"For if He were on earth, He should not be a priest, see-

ing that there are priests that offer gifts according to the law: **Who serve unto the example and shadow of heavenly things**, as Moses was admonished of Elohim when he was about to make the tabernacle: for, See, says He, that thou make all things according to the pattern shown to thee in the mount. But now hath he obtained a more excellent ministry, by how much also he is the mediator of a better covenant, which was established upon better promises," (Hebrews 8:4-6).
But the Messiah being come an High Priest of good things to come, **by a greater and more perfect tabernacle, not made with hands**, that is to say, not of this creation," (Hebrews 9:11).

"**But the Messiah being come an high priest of good things to come, by a greater and more perfect tabernacle, not made with hands, that is to say, not of this building;** Neither by the blood of goats and calves, but by his own blood He entered in once into the holy place, having obtained eternal redemption for us," (Hebrews 9:11-12).

"It was therefore necessary that the patterns of things in the heavens should be purified with these; but the heavenly things themselves with better sacrifices than these. **For the Messiah is not entered into the holy places made with hands, which are the figures of the true;** but into heaven itself, now to appear in the presence of Yahweh for us: Nor yet that He should offer himself often, as the high priest enters into the holy place every year with blood of others," (Hebrews 9:23-25).

Instead of listening to the voice of their Creator, they, like Job and his friends, speak to hear themselves talk and boast of their own knowledge. As to Job, so Yahweh speaks to these vain men.

Then Yahweh answered Job out of the whirlwind, and said: "Who *is* this who darkens counsel
By words without knowledge? Now prepare yourself like a man;
I will question you, and you shall answer Me. " Where were you when I laid the foundations of the earth?
Tell *Me,* if you have understanding. Who determined its measurements?
Surely you know!
Or who stretched the line upon it? To what were its foundations fastened?
Or who laid its cornerstone, When the morning stars sang together,
And all the sons of Elohim shouted for joy? "Or *who* shut in the sea with doors,
When it burst forth *and* issued from the womb; When I made the clouds its garment,
And thick darkness its swaddling band; When I fixed My limit for it,
And set bars and doors; When I said,
'This far you may come, but no farther,
And here your proud waves must stop!' "Have you commanded the morning since your days *began,*
And caused the dawn to know its place, That it might take hold of the ends of the earth,
And the wicked be shaken out of it? It takes on form like clay *under* a seal,
And stands out like a garment. From the wicked their light is withheld,
And the upraised arm is broken. "Have you entered the springs of the sea?
Or have you walked in search of the depths? Have the gates of death been revealed to you?
Or have you seen the doors of the shadow of death? Have you comprehended the breadth of the earth?
Tell *Me,* if you know all this. " Where *is* the way *to* the dwelling of light?
And darkness, where *is* its place, That you may take it to its territory,
That you may know the paths *to* its home? Do you know *it,* because you were born then,
Or *because* the number of your days *is* great? "Have you entered the treasury of snow,
Or have you seen the treasury of hail, Which I have reserved for the time of trouble,
For the day of battle and war? By what way is light diffused,
Or the east wind scattered over the earth? "Who has divided a channel for the overflowing *water,*
Or a path for the thunderbolt, To cause it to rain on a land *where there is* no one,
A wilderness in which *there is* no man; To satisfy the desolate waste,
And cause to spring forth the growth of tender grass? Has the rain a father?
Or who has begotten the drops of dew? From whose womb comes the ice?
And the frost of heaven, who gives it birth? The waters harden like stone,
And the surface of the deep is frozen. "Can you bind the cluster of the Pleiades,
Or loose the belt of Orion? Can you bring out Mazzaroth in its season?
Or can you guide the Great Bear with its cubs? Do you know the ordinances of the heavens?
Can you set their dominion over the earth? "Can you lift up your voice to the clouds,
That an abundance of water may cover you? Can you send out lightnings, that they may go,
And say to you, 'Here we *are!* '? Who has put wisdom in the mind?
Or who has given understanding to the heart? Who can number the clouds by wisdom?
Or who can pour out the bottles of heaven, When the dust hardens in clumps,
And the clods cling together? "Can you hunt the prey for the lion,
Or satisfy the appetite of the young lions, When

they crouch in *their* dens,
Or lurk in their lairs to lie in wait? Who provides food for the raven,
When its young ones cry to Elohim,
And wander about for lack of food?
"Do you know the time when the wild mountain goats bear young?
Or can you mark when the deer gives birth?
Can you number the months *that* they fulfill?
Or do you know the time when they bear young? They bow down,
They bring forth their young,
They deliver their offspring. Their young ones are healthy,
They grow strong with grain;
They depart and do not return to them. "Who set the wild donkey free?
Who loosed the bonds of the onager, Whose home I have made the wilderness,
And the barren land his dwelling? He scorns the tumult of the city;
He does not heed the shouts of the driver. The range of the mountains *is* his pasture,
And he searches after every green thing. "Will the wild ox be willing to serve you?
Will he bed by your manger? Can you bind the wild ox in the furrow with ropes?
Or will he plow the valleys behind you? Will you trust him because his strength *is* great?
Or will you leave your labor to him? Will you trust him to bring home your grain,
And gather it to your threshing floor? "The wings of the ostrich wave proudly,
But are her wings and pinions *like the* kindly stork's? For she leaves her eggs on the ground,
And warms them in the dust; She forgets that a foot may crush them,
Or that a wild beast may break them. She treats her young harshly, as though *they were* not hers;
Her labor is in vain, without concern, Because Elohim deprived her of wisdom,
And did not endow her with understanding. When she lifts herself on high,
She scorns the horse and its rider. "Have you given the horse strength?
Have you clothed his neck with thunder? Can you frighten him like a locust?
His majestic snorting strikes terror. He paws in the valley, and rejoices in *his* strength;
He gallops into the clash of arms. He mocks at fear, and is not frightened;
Nor does he turn back from the sword. The quiver rattles against him,
The glittering spear and javelin. He devours the distance with fierceness and rage;
Nor does he come to a halt because the trumpet *has* sounded. At *the blast of* the trumpet he says, 'Aha!'
He smells the battle from afar,
The thunder of captains and shouting. "Does the hawk fly by your wisdom,
And spread its wings toward the south? Does the eagle mount up at your command,
And make its nest on high? On the rock it dwells and resides,
On the crag of the rock and the stronghold. From there it spies out the prey;
Its eyes observe from afar. Its young ones suck up blood;
And where the slain *are,* there it *is.* " Moreover Yahweh answered Job, and said: "Shall the one who contends with the Almighty correct *Him?*
He who rebukes Elohim, let him answer it." Then Job answered Yahweh and said: " Behold, I am vile;
What shall I answer You?
I lay my hand over my mouth. Once I have spoken, but I will not answer;
Yes, twice, but I will proceed no further." Then Yahweh answered Job out of the whirlwind, and said: "Now prepare yourself like a man;
I will question you, and you shall answer Me: " Would you indeed annul My judgment?
Would you condemn Me that you may be justified? Have you an arm like Elohim?
Or can you thunder with a voice like His? Then adorn yourself *with* majesty and splendor,
And array yourself with glory and beauty. Disperse the rage of your wrath;
Look on everyone *who is* proud, and humble him. Look on everyone *who is* proud, *and* bring him low;
Tread down the wicked in their place. Hide them in the dust together,
Bind their faces in hidden *darkness*.Then I will also confess to you
That your own right hand can save you. "Look now at the behemoth, which I made *along* with you;
He eats grass like an ox. See now, his strength *is* in his hips,
And his power *is* in his stomach muscles. He moves his tail like a cedar;
The sinews of his thighs are tightly knit. His bones *are like* beams of bronze,
His ribs like bars of iron. He *is* the first of the ways of Elohim;
Only He who made him can bring near His sword. Surely the mountains yield food for him,
And all the beasts of the field play there. He lies under the lotus trees,
In a covert of reeds and marsh. The lotus trees cover him *with* their shade;
The willows by the brook surround him. Indeed the river may rage,
Yet he is not disturbed;
He is confident, though the Jordan gushes into his mouth, *Though* he takes it in his eyes,
Or one pierces *his* nose with a snare.

"Can you draw out Leviathan with a hook,
Or *snare* his tongue with a line *which* you lower? Can you put a reed through his nose,
Or pierce his jaw with a hook? Will he make many supplications to you?
Will he speak softly to you? Will he make a covenant with you?
Will you take him as a servant forever? Will you play with him as *with* a bird,
Or will you leash him for your maidens? Will *your* companions make a banquet of him?
Will they apportion him among the merchants? Can you fill his skin with harpoons,
Or his head with fishing spears? Lay your hand on him;
Remember the battle--
Never do it again! Indeed, *any* hope of *overcoming* him is false;
Shall *one not* be overwhelmed at the sight of him? No one *is so* fierce that he would dare stir him up.
Who then is able to stand against Me? Who has preceded Me, that I should pay *him?*
Everything under heaven is Mine. "I will not conceal his limbs,
His mighty power, or his graceful proportions. Who can remove his outer coat?
Who can approach *him* with a double bridle? Who can open the doors of his face,
With his terrible teeth all around? *His* rows of scales are *his* pride,
Shut up tightly *as with* a seal; One is so near another
That no air can come between them; They are joined one to another,
They stick together and cannot be parted. His sneezings flash forth light,
And his eyes *are* like the eyelids of the morning. Out of his mouth go burning lights;
Sparks of fire shoot out. Smoke goes out of his nostrils,
As *from* a boiling pot and burning rushes. His breath kindles coals,
And a flame goes out of his mouth. Strength dwells in his neck,
And sorrow dances before him. The folds of his flesh are joined together;
They are firm on him and cannot be moved. His heart is as hard as stone,
Even as hard as the lower *millstone.*When he raises himself up, the mighty are afraid;
Because of his crashings they are beside themselves. *Though* the sword reaches him, it cannot avail;
Nor does spear, dart, or javelin. He regards iron as straw,
And bronze as rotten wood. The arrow cannot make him flee;
Slingstones become like stubble to him. Darts are regarded as straw;
He laughs at the threat of javelins. His undersides *are* like sharp potsherds;
He spreads pointed *marks* in the mire. He makes the deep boil like a pot;
He makes the sea like a pot of ointment. He leaves a shining wake behind him;
One would think the deep had white hair. On earth there is nothing like him,
Which is made without fear. He beholds every high *thing;*
He *is* king over all the children of pride." (Job38-41).

And like Job, if they would get on their knees and repent of their sins, Yahweh would reveal to them the knowledge they so vainly seek on their own.

Then Job answered Yahweh and said: "I know that You can do everything,
And that no purpose *of Yours* can be withheld from You. *You asked,* 'Who *is* this who hides counsel without knowledge?'
Therefore I have uttered what I did not understand,
Things too wonderful for me, which I did not know. Listen, please, and let me speak;
You said, 'I will question you, and you shall answer Me.' "I have heard of You by the hearing of the ear,
But now my eye sees You. Therefore I abhor *myself,*
And repent in dust and ashes." (Job 42:1-6).

May we all pray along with Job and “repent in dust and ashes” as we acknowledge that Yahweh through His Son, Yahshua created and sustains the universe.

HalleluYah!

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