BPAA Newsletter

Battle Point Astronomical Association, Bainbridge Island, WA

Issue 71 | September-October-November Calendar | Fall 2005

(Unless otherwise noted, all events are at the Edwin Ritchie Observatory, Battle Point Park)

September

September 1–4: Oregon Star Party
www.oregonstarparty.org
September 3: New Moon
September 4: John Rudolf Memorial Planetarium Fund
Kiwanis Brunch, Wing Point
September 7: BPAA Board Meeting 7 p.m.
September 10: Star Party Battle Point Park.
Beginner session 7 p.m.
September 11: First-quarter Moon
September 14: Member Meeting 7 p.m.
John Dobson's 90th Birthday (1915)
September 17: Full Moon,
Ritchie Telescope Tutorial 7 p.m.
September 22: Autumnal Equinox
September 25: Last-quarter Moon

October

October 2: John Rudolf Memorial Planetarium Fund
Kiwanis Brunch, Wing Point
October 3: New Moon
October 5: BPAA Board Meeting 7 p.m.
October 8: Star Party Battle Point Park,
Beginner Session 6 p.m.
October 10: First-quarter Moon
October 12: Member Meeting 7 p.m.
October 15: Ritchie Telescope Tutorial 7 p.m.
October 17: Full Moon; Partial eclipse of the Moon
Mid-eclipse at 5:04 PDT
October 21: Orionids Meteor Shower Peak
October 24: Last-quarter Moon
October 30: Daylight Savings Time ends

November

November 1: New Moon

Anna Edmonds in the Grand Old Fourth Parade.
Photo courtesy Colin Edmonds.

November 2: BPAA Board Meeting 7 p.m.
November 3: Taurids Meteor Shower Peak
November 5: Star Party Battle Point Park
Beginner Session 5 p.m.
November 6: John Rudolf Memorial Planetarium Fund
Kiwanis Brunch, Wing Point
November 8: State General Election,
First-quarter Moon
November 9: Member Meeting 7 p.m.
November 15: Full Moon
November 12: Ritchie Telescope Tutorial, 7 p.m.
November 17: Leonids Meteor Shower Peak
November 23: Last-quarter Moon

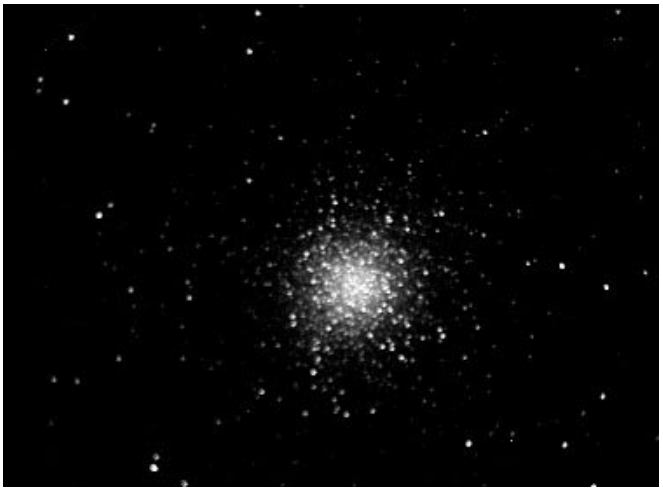
Calendar Notes

We begin a quarterly publication schedule with this issue of the newsletter. Hard to believe that it is time for the autumn issue. The summer went by quickly, getting off to a late start, but later affording many clear nights for viewing. The long evenings of autumn are welcome, providing extra hours of observing time. To take advantage of this seasonal bonus, our fall star parties are scheduled for earlier times: 6:00 p.m. in October and 5:00 p.m. in November.

The autumn skies always bring special views. In early September, Jupiter and Venus are in conjunction just above the west-southwestern horizon, shortly after sunset. On September 6, look for a thin crescent Moon, Jupiter and Venus together in a triangle, just after sunset. On September 7, the Moon, Jupiter and Venus will be in line at early twilight. On September 17, there will be a full harvest moon.

In October, Jupiter will disappear, but Venus will be higher and easier to see. It will be just above the thin crescent Moon on October 6. Mars will be bright in the eastern sky. On October 29, Mars will be closest to the Earth, 43 million miles away; it won't be this close again until 2018. The Summer Triangle, Vega, Deneb, and Altair, will still be visible, but descending in the west. The Great Square of Pegasus will be high in the east.

Meanwhile, back on Earth, we still need to think about those soccer lights obliterating our view of the sky. The Park Board gave us a temporary reprieve on July 14, voting to allow the soccer group to return to the board with a proposal for rebuilding the soccer fields in Battle Point Park. No motion was made on the lights, for or against, and only one member of the board, Dave Shorett, voiced any opposition to the installation of lights at Battle Point Park. It is likely that the soccer group will be back before the Park Board, urging installation of lights. Kirk Robinson, the Park Board's chairman, said at the meeting that he would consider lights at Battle Point as a last resort. To me, this means that he would vote for the installation of lights if the soccer group finds no other place on the Island for nighttime play.



The Great Hercules Cluster, M-13, the showpiece globular cluster of the northern hemisphere. 25,000 light-years from earth, with an approximate diameter of 160 light-years, it is estimated that it contains more than a million stars. Photo taken July 17 near Ritchie Observatory by Harry Colvin.

Kirk Robinson's term ends this year; his position will be on the state general election ballot on November 8. Mary Fearey, who lives on Tolo Road and is a frequent user of Battle Point Park, has filed to run against Robinson. Ms. Fearey is opposed to installation of lights at Battle Point Park. Her E-mail address is mkfearey@msn.com. Contact her if you have questions and concerns about the future of Battle Point Park. And by all means, if you live on Bainbridge Island, vote on November 8!

Remember that any member who plans to observe at any time can invite others to join in by sending an E-mail to bpaa@yahoogroups.com. To join our E-mail group, send an E-mail with your name to bpaa-owner@yahoogroups.com and we can enroll you. If you want to also have web access to the messages and files, you can join the yahoogroups by clicking the register link for new users on http://groups.yahoo.com/, and request to join our group at: http://groups.yahoo.com/group/bpaa/. The system will send us a message, and we'll approve your request after we verify your membership.

—Diane Colvin (dtcolvin@comcast.net) BPAA Events Director

In Brief

President's Message

Paul Below

I hope you were able to attend the Open House on July 30. The weather was absolutely perfect. We had some great talks and a wonderful potluck dinner. The star party following the potluck was well-attended; club members shared their fascination with the night sky with the community. There was a great selection of personal telescopes in operation, and we opened the large scope.

I held a night sky talk as it started to get dark, using the Club's green laser pointer. This device allows the speaker to point out specific stars or spots in the sky, and people within 30 feet or so can see the laser beam going up to infinity. This addresses a common problem, that of trying to see where someone is pointing while talking or asking questions. At star parties, people frequently ask where the object they just viewed through the telescope is in the sky, and whether they can see it naked eye. The laser is great

for explaining the star hop necessary to find the object, and point out the precise location.

I spoke on the basics of summertime orientation and viewing highlights:

★ The Summer Triangle (Vega, Deneb, and Altair)

★ The Big Dipper and finding the North Star and "Arcing" to Arcturus

★ From Vega, how to locate the Ring Nebula in Lyra

★ From Vega and Arcturus, how to locate the Great Cluster in Hercules

★ Cygnus and Alberio the double star and the Milky Way from Deneb

★ The teapot of Sagittarius and the best summer nebulae

★ Cassiopeia and, as it got higher, the Andromeda Galaxy, the farthest thing you can see with your own eyes.

I think the attendees enjoyed the talk, or maybe they were just wowed by the laser!

Photo by Colin Edmonds

Jim Vaughn and Diane and Harry Colvin tend BPAA's traditional 4th of July booth. Photo by Paul Below.


Photo courtesy Russ Heglund

BPAA members rose to the challenge of creating a parade entry on short notice—some sported custom constellation T-shirts; others showed their BPAA colors.
Joan Bobinski and Vicki Saunders created the shirts, Cathy and Glen Wyatt supplied plenty of Starbursts, Milky-Ways, and Mars Bars to toss to the crowd. Russ Heglund and Vicki wired galaxies and telescope to a wagon on loan from Foxglove Fiberarts Supply; marchers included Eric Cederwall, Anna, Bill, Colin, and Merrill Edmonds, Russ Heglund, Cathy, Irene, and Constance Koehler, George McCullough, and Allan, Helen, Malcolm,Vicki,and Ben Saunders.

Star Party Reports

Mt. Bachelor

Russell M. Heglund

My wife Jody and myself, Paul Below, Catherine Koehler, Dave Warman, Diane Colvin and Harry Colvin, all traveled down to Mt. Bachelor (in Oregon near Bend) to camp around the Sunrise Ski Lodge, at 6500 ft elevation. The first night, July 6, was clear, with the Milky Way glowing from horizon-to-horizon. The "Teapot" was up, and it would have been a perfect night except it was windy! A 20 to 30 mph wind blew all night …. we could point and look, but tracking with telescopes was shaky; and photography and image work was impossible. After taking a tour of the sky with Paul's Dob, we went to bed….half frozen by wind chill. That was to be our best night! The next couple days, clouds moved in, along with some rain. However, the food was good (especially the Cajun Barbecue), and so were the programs; Stephen Edberg of NASA, gave an engrossing slide show and talk about the Cassini Mission to Saturn. David Haworth talked about Astro-imaging. Richard Norton talked about meteors and meteorites. The Sunriver Nature Center people also put on their popular "Nocturnal Nature Walk," for those interested in bats, and other things that only come out at night. The Sunriver people are the Star Party sponsors, and they do an excellent job….if only they could control the weather.

Notes From a Week at Table Mountain

Harry Colvin

Around 5:30 p.m. Sunday, July 31, Diane and I topped the ridge to the Star Party. Some of the TMSP tents and trailers had already arrived, but we found a prime spot just off the main field. The 110 mile drive, a comparatively short drive for a major Star Party, was uneventful. The final 22 miles up the mountain is paved for the first 20 miles but is steep and twisting. The final two miles of gravel was grueling wash-board, so the going was slow.

Panoramic View of the 2005 Table Mountain Star Party. Photo by Russ Vodder, TMSP Web site.

We set up the Kendrick tent for the first time, in 5–10 knots of wind. By dark I had the tripod, the LX200, and cables in place ready for a night of imaging. As it turned out my compass was right on Polaris, so initial alignment went easy, but the drift alignment turned out to be a challenge. The wind had picked up to 10–15 knots with higher gusts. Although I was able to drift align there would be no imaging the first night.

Monday was clear all day and promised to remain that way at night although the wind was still strong. By dark the wind dropped a bit but it was cold and I was happy to be snug in the back section of the Kendrick tent. The temperature was a chilly 35 degrees. I returned to our trailer frequently to warm up, wake up my spouse, and report on my imaging adventures. She was not amused.

NGC 5280 in Canes Venatici has five companion galaxies, some as faint as Mag. 15, but in these dark skies they were easy targets for my MX916 camera. I soon moved on to imaging galaxy targets around NGC 6472 in Draco of which there are 13 in the cluster. Around 4:30 a.m., the sky began to brighten up, so I called it quits.

Tuesday more people arrived, some old friends that we see at almost every star party. Many faces are familiar, but I don't know their names. The weather was warm and breezy during the day, but the temperature and the wind dropped that night and I had no trouble imaging two galaxy clusters. But the 12 companion galaxies around M106 took a long time and about six image sets.

By now my fame and imaging techniques were spreading among my Dob neighbors. It went like this: big Dob owner :"Hey, Harry, could you swing over to NGC 1325 (a.k.a. faint galaxy) and show me what's there, I know I'm right on top of it but— " A few minutes later the big Dob owner would appear at the door of my tent wanting a peek at the elusive object. One example was the very faint galaxy IC 1296, two arc minutes to the west of the Ring nebula, at Mag.15.1, faint with low surface brightness. It was not detectable even in a 22" Dob and it took the MX916 camera about two minutes to gather sufficient data before detection. Around 4:00 a.m. I zipped up the tent and retired to the trailer. Another good night of viewing, two in a row.

On Wednesday my spouse drove back to Bainbridge Island for a BPAA board meeting and I was left to fend for myself for a couple of days. The day saw more arrivals and the main observing field became even more crowded.

About 11:00 a.m. I was talking to Frank, one of the TMSP directors, when his radio came alive announcing that due to a forest fire, entry into the star party site had been closed. Sure enough there was a large column of smoke over the ridge. About 15 minutes later it was announced that the fire was about 20 miles away and across I-90. Smoke by that time was covering most of the edge of the western horizon. I spent some time setting up my 10" Dob and then turned in for a nap around 2:30 p.m. Around 4:00 p.m. someone knocked on my trailer to tell me that the area had been hit by a strong dust devil and that several tents had been damaged. Quickly jumping out of a deep sleep I found my Kendrick tent had been spared but my 10" Dob had been turned over and was lying on its side. To my relief the mirror was OK and nothing appeared broken or bent.

I spent most of Wednesday night imaging galaxy clusters around NGC 80, 329, and 383, about 38 galaxies total. After the day's excitement it was a calm night.

On Thursday fire-fighting planes were passing overhead most of the day. We spent the early evening

looking at 30-second images of Messier objects. Later while working on a galaxy cluster near NGC 507 I noticed the sky transparency dropping, then the smell of smoke, and finally burning eyes. I gave up around 2:00 a.m., only completing one galaxy cluster.

Planes continued to work on the fire most of Friday. We learned that a second fire was burning about 40 miles to the west. That evening the observing field was busy with several groups of visitors in the tent and in spite of the fire the smoke seemed to have drifted to the north. I completed imaging the final four galaxy clusters on my list and retired once again just before daybreak.

There were more planes overhead on Saturday and more smoke, but it turned out to be the clearest night of the week. I spent the first part of the evening imaging Pluto and Neptune. They appeared as star-like objects and were not very interesting. Later I attempted to image Einstein's Cross, a gravitational lensing object around galaxy CGCG 378-15. No luck with this one. The problem is likely insufficient resolution.

On Sunday we packed up and drove back to Seattle. It had been the best Table Mountain in history. Six clear nights with Mag. 6 skies. Yes, the Table Mountain Star Party is crowded, and not as dark as OSP, but it is just a 3-hour drive from Seattle and this year was well worth the trip.

Editor's Note:Next year's TMSP runs from July 20–22. If you plan to go, register early—registration often fills by early April.

How's the Big Telescope

Malcolm Saunders

The Ritchie telescope is doing fine and getting better as we continue to work on it. It's seeing increased use now that we can rely on the Go-To function, and as club members learn how to operate it. Since the last newsletter we have added the ability to control the telescope from a planetarium program. Currently that planetarium program is *Cartes du Ciel*, free downloadable software. This makes the telescope easier, and more intuitive to use, sort of point and click. I encourage anyone who is interested in using the Ritchie telescope to install a copy of the program on their home computer and become familiar with it. Several alternative planetarium programs exist (*Starry Night, Earth Centered Universe, Megastar*, etc.) and if you wish to install your favorite this can be accommodated.

We have begun using the Stella Cam video camera in the telescope recently. I am preparing a short How-To page for that. Using the Stella Cam allows several people to see the view at once on a television monitor, although it lacks some of the romance of looking through the eyepiece.

Plans are afoot for more mechanical upgrades during the coming winter when the telescope is used less.

The Ritchie telescope is available for any qualified member to use. I encourage everyone to learn how. I will continue to offer tutorials on operating the telescope once a month on the Saturday nearest the full moon. This will leave the telescope free for observing on the other, darker, weekend nights. Requirements for attending these tutorials are: membership in the club, patience, and a willingness to help out at the observatory: for example at star parties or by serving as a docent on a Sunday afternoon once a month. Another option is to work on the telescope. This is an excellent way to learn the ins and outs of the instrument.

Tutorial sessions in the coming months will be on Saturdays, September 17, October 15 and November 12. Most of what you need to know you can learn day or night, rain or shine, so these sessions will happen regardless of weather. I appreciate, but don't require, a note ahead of time if you plan to attend: Malcolm Saunders at saunders@drizzle.com

Don't forget BPAA has an assortment of telescopes on hand to lend out to members. Contact Russ Heglund, rmheglund@yahoo.com, (206) 842-8758, pictured here with a recently donated 10" Criterion Reflector.

August 13 Star Party at Ritchie Observatory: Dave Warman showing off the sky, Paul Below teaching,

Articles

Seeing Stars Astronomy 0.001 Hunting Grounds and Meadows

Anna Edmonds

When I was a child my friends and I spent many daylight hours entertaining ourselves with imagining animals or faces in the clouds. The craggy features of Abraham Lincoln must have appeared more than once, only to segue into a bearded goat.

Surely something of the same imagination was at play 5000 years ago when Sumerian and Acadian shepherds of the Middle East saw the shapes of a heavenly flock in the outlines of the bright stars at night. They were more serious about their imagining than I was: They knew that with those lights they could find their way through their changing years. They called the seven that wandered "sheep." I think that we should be amazed that they had linked these seven together without knowing as much about them as we do. For them, the brightest of the seven was "the old sheep;" that one was the Sun. The other six wanderers—the Moon, Mercury, Venus, Mars, Jupiter, and Neptune—were "the old sheep stars." (Did old sheep tend to wander more than frolicsome lambs? And why were the wanderers confined within so narrow a path in the sky?)

Of course what my friends and I saw in the sky was shapes we were familiar with, and of course that's always been true for others. The constellation Boötes (the herdsman) was a hippopotamus in Egypt, but in China it was part of a huge dragon. What we (and the Greeks and Romans) call a bear the Inuit call a caribou (Tukturjuit).

With Orion the hunter and Sagittarius (the centaur or archer) in the stars, it's not surprising that there are also a lot of game animals there. Maybe it's Sagittarius' arrow (Sagita) that flies between the little fox (Vulpecula) and the dolphin (Delphinus) in the summer and fall. (While otherwise unspectacular, Vulpecula is the location of M27—the Dumbbell Nebula.) There's a whale (Cephus) between Cygnus and Cassiopeia, and our Western dragon (Draco) that winds and twists between the two bears (Ursa Major and Ursa Minor).

These are only some of the animals; among the many others are a couple of donkeys, a couple of tortoises, a unicorn, and a gazelle. I'll let you wonder where they're hiding, and also add a number of your own.

Johann Buhle, "Hemisphaerium Boreale" from Aratus, *1793&1801.*

Being good at tending their earthly flocks, the ancient shepherds/astronomers also tried to take care of the heavenly ones. They gave them a pool (the dark area between Ursa Major and Leo), a manger (Praesepe, more commonly called the Beehive) in the Crab (Cancer), and a river (Eridanus). The Sumerians called one of the very brightest of the stars "the star of the shepherds of the heavenly flock" (Sibzianna); for us it's Arcturus, "the herder (ourus) of the bear (arctus).

The sky as a heavenly meadow is a common image in poetry. Longfellow used it in Evangeline:

Silently one by one, in the infinite meadows of heaven
Blossomed the lovely stars, the forget-me-nots of the angels.
And Virgil gave Aeneas a parting love song for Queen Dido:
As long as the clouds float over the mountain valleys,
As long as the rivers run down to the seas,
As long as the stars feed in the heavenly pastures,
So long will your name and your honor stay with me
To whatever lands I am called.

The old sheep must still be there, along with a goat (Capella) and her three kids, all feeding on forget-me-nots, or the sheaf of wheat (Spica), or on our imaginations.

Is Dark Matter a Chimera?

Ted S. Frost

Assumptions can be dangerous, especially in science. They usually start as the most plausible or comfortable interpretation of the available facts. But when their truth cannot be immediately tested and their flaws are not obvious, assumptions often graduate to articles of faith, and new observations are forced to fit them,
—Prof. John S. Mattick

Hang on. We are about to go where angels fear to tread—theoretical physics. For many years, astronomers have been searching for so-called "Dark Matter," the assumed missing matter needed to hold the galaxies together.

Scientists have long known that what they see out in the firmament isn't obeying the physical laws of gravity and inertia. Based on the amount of matter that can be detected, stars should be flying off in every direction rather than swirling around in galactic clusters. The assumption is that there is some sort of matter out there that has gravitational effects,[1] even though we can't see it. In fact, very little (5%) of our universe is capable of being directly observed by our five senses. If Dark Matter exists, it, along with Dark Energy, make up most of the universe.

ASSUMED COMPOSITION OF THE UNIVERSE (adapted from *Scientific American*, October 2003[1])

Material	Representative Particles	Probable Contr. To Mass Of Universe
Stuff we can 'see' (baryonic matter)	Protons, neutrons & electrons	5%
Dark matter	???	25%
Dark energy	???	75%
Other stuff	Neutrinos, background photons, etc.	0.3%

The major candidates for Dark Matter are: (1) — MACHOS (Massive Compact Halo Objects), such as brown dwarf stars, Jupiters, and black holes; and (2) — WIMPS (Weakly Interacting Massive Particles), which consist of hundreds of suggested exotic particles which we have not yet discovered or which have non-standard properties.

Years of research have come up empty. We still do not know the exact nature of Dark Matter. Even if its exact properties were determined, there would still be the problem of figuring out why it seems to be distributed within galaxies in a particular way.

Nevertheless, Dark Matter is still the leading theoretical picture for the formation of structure in the Universe, although the search now seems to focus mainly on intricate computer simulations involving speculative particles[2]. Even though the search for Dark Matter has floundered, it is so firmly imbedded in the minds of astronomers that any alternative explanation tends to be dismissed. Such was the reaction Mordehai Milgrom experienced when he proposed a different solution[3].

Milgrom is an Israeli physicist who in 1983 suggested it wasn't missing mass at all. Instead, the effect astronomers were seeing was due to a difference in the laws of gravity that he called "MOND" (Modified Newtonian Dynamics).

Milgrom proposed that at very slow accelerations the force of gravity shifts into a higher gear and increases. He deemed the cross-over point to be an acceleration termed "a_0" whose value is 1.2×10^{-10} m.s^{-2}. Milgrom's a_0 presumably represents a parameter of nature like the

speed of light or the weight of a proton.

The standard Newtonian equation for the force of gravity is expressed as follows:

$$F = \frac{Gm_1m_2}{r^2} = m_1a_1$$

Where:

F is the force (m_1a_1) on object *1* due to object *2*

G is the gravitational constant = $6.7\text{x}10^{-11}$ $m^3kg^{-1}s^{-2}$

m_1 and m_2 are the masses of objects *1* and *2*

a_1 is the acceleration of object *1*

r^2 is the square of the distance between *1* and *2*

The m_1's in the formula offset. Therefore, the gravitational acceleration of object *1* becomes:

$$a_1 = \frac{Gm_2}{r^2}$$

Thus we have the famous high school physics phenomenon of the acceleration of object *1* not being dependent on object *1*'s mass so that, in a vacuum, a feather will hit the earth at the same time as a lead ball.

Milgrom modified Newton's formula to:

$$[\mu(a_1 / a_0)]a_1 = \frac{Gm_2}{r^2}$$

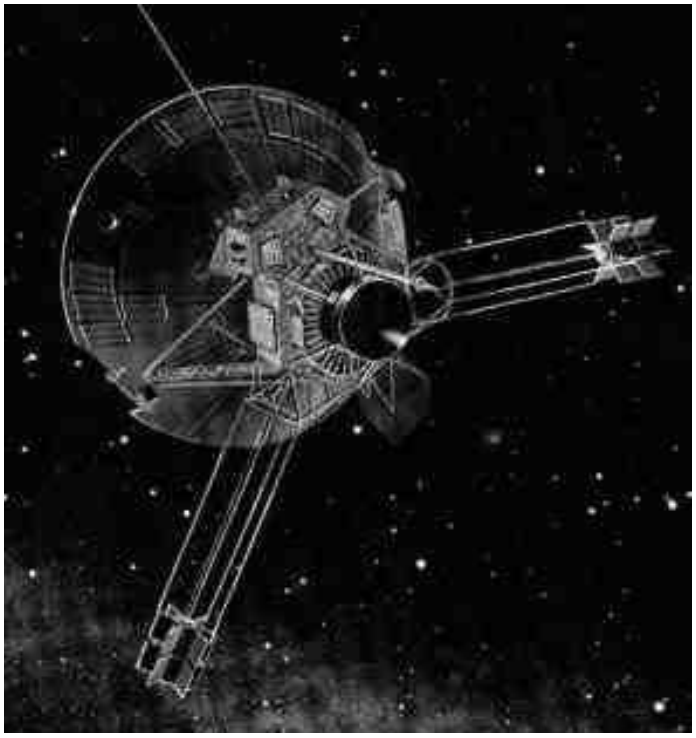
Where $\mu(a_1/a_0)$ is a function that equals *1* when a_1 is greater than a_0, thereby becoming Newton's original formula. But when a_1 is less than a_0, the function becomes a_1, turning the left side of the formula into $(a_1)^2$ so that:

$$a_1 = \frac{(Gm_2a_0)^{1/2}}{r}$$

The consequence of Milgrom's MOND formula is that, for accelerations less than a_0, gravity declines linearly by distance *r* instead of by the square of the distance, r^2. This would apply to the motion of stars in galaxies since their centripetal accelerations are in the MOND realm. Hence, the extra gravitational attraction scientists have been scratching their heads over. Eureka!

MOND has successfully predicted several subsequent technical astronomical observations. For example, MOND predicted the 'rotational curves' of 'low surface brightness galaxies' much better than Dark Matter models[4].

MOND also seems to solve the so-called Pioneer Anomaly. In 1980, NASA astronomers noticed that spacecrafts Pioneer 10 and Pioneer 11 were decelerating as they left our solar system in a way that violated Newton's gravity law. It was as though the gravitational force being exerted on them by the far-away Sun had increased.

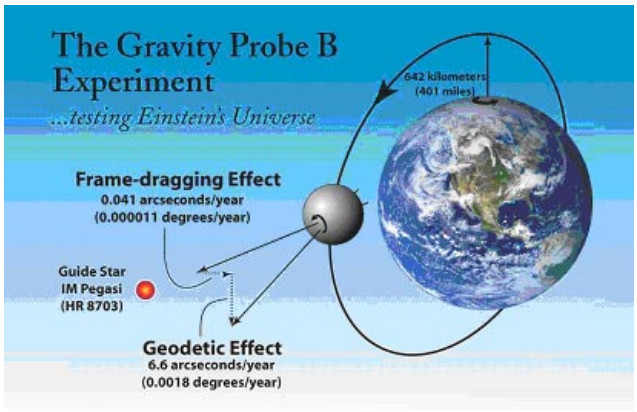


Pioneer 10 in deep space: Courtesy NASA

Despite analyses looking for systematic mechanical explanations such as fuel or energy leaks, etc., the Pioneer mystery was never solved. Except that the change in acceleration turns out to be very close to what Milgrom's MOND predicts[5]!

In spite of MOND's apparent success explaining such things, it has until recently received two reactions: complete disregard for his idea, or a conviction that it couldn't be right.

There is a significant theoretical problem with Milgrom's concept. MOND does not relate in any way to Einstein's general relativity field equations theory of gravitation. According to Einstein, mass warps space-time which causes modifications to Newtonian gravity when velocities approach the speed of light or when



NASA's 2004 Gravity Probe B experiment testing Einstein's concept of gravity (distortion of space-time by Earth's mass and dragging of space-time by its rotation)

gravitational fields are very strong. MOND does not speak to this phenomenon.

However, interest in MOND is now on the upswing[6] due to a recent paper by another Israeli scientist, Jabob D. Bekenstein. Bekenstein has expanded MOND by imbuing it with something called tensor-vector-scalar (TeVeS) field theory[7].

The TeVeS modifications tie MOND to Einstein's relativity equations making it right with the world as we know it (or at least as we think that we know it). The details are much too complicated and technical for a layman such as me to comprehend, but commentaries by those who do have the necessary expertise are encouraging.

If Milgrom and Bekenstein are right, it means gravity has three 'gears' it can shift into: MOND for very low accelerations, Newtonian for 'normal' velocities and masses, and TeVeS (or Einsteinian) for general relativity scales.

So, the long search for Dark Matter may be coming to a close. Not because the search has been successful, but rather because scientists were looking in all the wrong places.

Gravity, after all, is a mysterious force. Scientists have been struggling mightily to come up with equations that tie gravity to the other three forces of nature, i.e.: the quixotic search for "TOE," the theory of everything. This has led to such weirdness as String Theory which postulates we live in a world where six extra dimensions exist that we cannot physically perceive. If the world we live in is that strange, why should it be a surprise that gravity may have peculiarities in and of itself?

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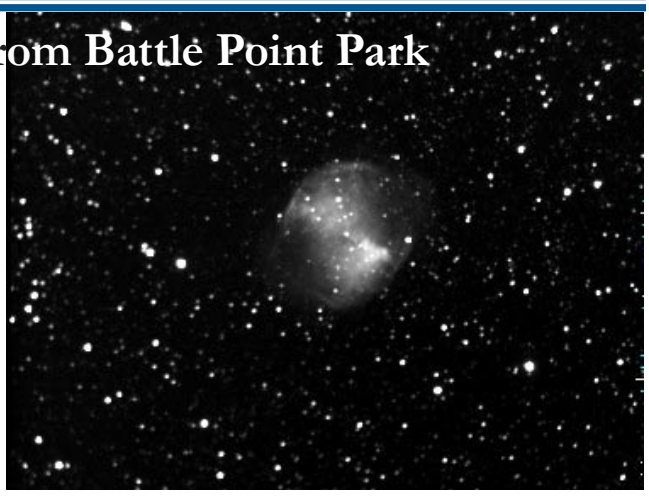
3. "Dark Matter Heretic," M. Szpir, *American Scientist Online*, (Jan-Feb 2003).
4. "Dark Matter On Galactic Scales (Or The Lack Thereof)," M. R. Merrifield, *Astrophysics*, abstract astro-ph/0412059, (Dec.2,2004).
5. "Nailing Down Gravity," T. Folger, *Discover Magazine*, (October 3, 2003).
6. "Are There Two Types of Gravity?" M. Chown, *New Scientist*, issue 2483, (Jan. 22, 2005).

Views of the Universe from Battle Point Park

M-51, the Whirlpool galaxy, 37 million light years away. Estimates of its diameter range up to 100,000 light-years. Note the nuclear bulge, arched lanes of stars and glowing interstellar clouds, which appear as spiral arms, characteristic of a spiral galaxy.



M-27, the Dumbbell Nebula, a planetary nebula. (Planetary nebulae are thin shells of gas surrounding a single star.) 900 light-years from earth.

Photos taken July 17 near Ritchie Observatory by Harry Colvin.

In This Issue

First-quarter Moon, photo by David Warman, Battle Point Park August 13

Send submissions to *Newsletter Editor*
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Electronic submissions required.
Attach graphics as separate files. Do not embed.
Include 'BPAA Newsletter' in subject line.

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