

May 2006

Special points of interest:

- Get Ready for Summer Observing
- XMM-Newton Digs into the Secrets of Fossil Galaxy Clusters
- The Cosmos Does Not Glimmer As We Thought

May Meeting:

Ten Worlds - Everything that orbits the sun.

Ken Croswell

On May 17, astronomer and author Ken Croswell returns to the SAS to give the talk for his new book: *Ten Worlds ? Everything That Orbits the Sun*. Dr. Croswell's books are among the most beautifully illustrated and well researched astronomy books available. His six previous books are *The Alchemy of the Heavens*, *Planet Quest*, *Magnificent Universe*, *See the Stars*, *The Universe at Midnight* and *Magnificent Mars*.

With the discovery of a new world larger than Pluto and three times farther from the Sun, our solar system now has *ten* known planets. During this talk, astronomer Ken Croswell takes you on an up-to-date tour of them all, showing spectacular color images of the planets and their largest satellites. He focuses on the latest developments beyond Neptune: astronomers have spotted more than a thousand icy objects in the Edgeworth-Kuiper belt, whose largest members are Pluto and the newly discovered tenth planet, 9 billion miles from the Sun. Furthermore, we now know of three moons orbiting Pluto and one moon orbiting the tenth planet. What are these far-off planets and their moons like? What will the newly launched spacecraft to Pluto tell us? And do Pluto and the tenth planet even deserve to be called planets?

Read more about Ken Croswell, his books and this talk at <www.kencroswell.com>.

Meeting Information

Wednesday, May 17
7:30 p.m.

Physics-Astronomy Building
Room A102
University of Washington
Seattle

Come early at 7 p.m. for coffee and snacks and to visit with your fellow members!



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Seattle Astronomical Society

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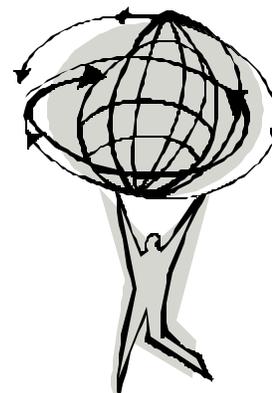
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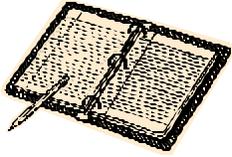
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From the President's Desk...

Get Ready for Summer Observing

By Thomas Vaughan

Summer Observing and Picnic

Are you ready for the summer observing season? The Table Mountain Star Party is July 20-22, register at <http://www.tmspa.com/> if you haven't already. There will be several SAS members there. Long-time member Mark deRegt is one of the featured speakers, covering CCD imaging. We will have some SAS-sponsored events at Table Mountain, come by an SAS monthly meeting for details.

Also, the SAS will be hosting a combination **Picnic and Telescope Tune-Up** party on Saturday, June 3rd. We are attempting to arrange to hold this somewhere at or near Greenlake to coincide with our usual public star party. Our VP Programs, Bruce Kelley, will have an update at the May meeting.

If you aren't going to the Table Mountain Star Party, consider dropping by the Rattlesnake Lake Trails Fest, on Saturday, July 22! This is a large festival whose purpose is "to generate attendance and awareness about outdoor recreation." There will be many local clubs there, and the SAS will also have a booth. Come by and say hello, and see what else is going on at TrailsFest. For more information, see the Washington Trails Association at <http://www.trailsfest.org/>.

Seattle-Area Astronomy

The past few weeks have been busy for the SAS, and other local astronomy groups! The SAS has participated at Yuri's Night (Museum of Flight), UW Astronomy Open House, and Space Day (Museum of Flight). In all we had well over 50 volunteer hours at just a few events. Many thanks to the several SAS members who donated time and energy to make these events a success!

I was lucky enough to participate at the UW Astronomy Open House, and Space Day. As always, it was fun to talk to people about opportunities for observing, and explaining what the SAS had to offer. It was also a good time to catch up with the other astronomy groups in the greater Seattle area. In the next few months, we'll have details on joint star parties with other local astronomy groups. Also, all clubs have expressed interest in our Dark Sky Site initiative, which should also help to bring area astronomers together.

Calling All Sidewalk Astronomers

With the better weather, we are hoping to resurrect the Sidewalk Astronomers Group. We are looking for folks who are interested in joining (or suggesting!) ad-hoc public star parties on short notice. The recent scheduled monthly star parties have been hampered by poor weather, so we'd like the ability to jump on clear nights whenever they come up. Come by the May SAS meeting for more information.

Rattlesnake Lake Access

Do you use Rattlesnake Lake as part of the SAS agreement with the City of Seattle? If so, you should be aware that access has changed lately. Contact the SAS Secretary, Chris Karcher (secretary@seattleastro.org) for details.

Happy Observing-
-Thomas

Photo from Member



This is a photo taken, by Burley Packwood, at 1:30 AM, April 23, of the periodic Comet Schwassmann-Wachmann 3 (also known as Comet 73P). In late 1995 this comet broke into at least three pieces. This is a photo of fragment C, the largest piece. At this time it was magnitude 9.2 and was in Corona Borealis. It was also visible in 10x50 binoculars. This comet will be brightest in mid-

May. At that time fragment C is expected to be about magnitude 4 and fragment B, the next largest fragment, is expected to be magnitude 4-6. I took this photo with a f6.3 10" Meade LX200 telescope using a ST-2000XM CCD and f/6.3 focal reducer for an effective focal length of f4.

SAS April 2006 Club Meeting Minutes



Announcements:

The SAS Picnic and Telescope Tune-Up will be held on Saturday, 6/3, location to be announced.

A debate will be held on 4/26 between Dr. Peter Ward, UW professor of Earth Sciences and Stephen Meyer, Director of the Center for Science and Culture on creation vs. evolution.

Saturday 4/29 is the UW Astronomy Department's Open House and Space Day. Members are encouraged to come and help with the SAS presence. Anyone wishing to bring a telescope with a solar filter is encouraged to do so. Don Brownlee will be giving a talk at 4:00PM.

Thursday 5/4 is Space Day at the Boeing Museum of Flight. SAS will have a presence and clear skies allowing, will join in with telescopes outside the museum.

There will be a SAS Dark Sky Site meeting in May, date to be announced. Dark Sky members and those thinking of becoming members are encouraged to attend. A Dark Sky board will likely be elected at this meeting.

Meeting Topic:

SAS member and VP-Education Burley Packwood was presented with the Astronomical League's Master Observer Award. Burley then proceeded to give an informative talk about the Astronomical League's award program with tips and experiences he gained while completed the requirements for his impressive collection of awards.

Member Don Wieckowicz gave an interesting presentation on his exciting trip to Libya to view the total Solar Eclipse of March 29th.

Meeting was adjourned around 9:00PM.

XMM-Newton Digs into the Secrets of Fossil Galaxy Clusters

Taking advantage of the high sensitivity of ESA's XMM-Newton and the sharp vision of NASA's Chandra X-Ray space observatories, astronomers have studied the behaviour of massive fossil galaxy clusters, trying to find out how they find the time to form...

Many galaxies reside in galaxy groups, where they experience close encounters with their neighbours and interact gravitationally with the dark matter - mass which permeates the whole intergalactic space but is not directly visible because it doesn't emit radiation.

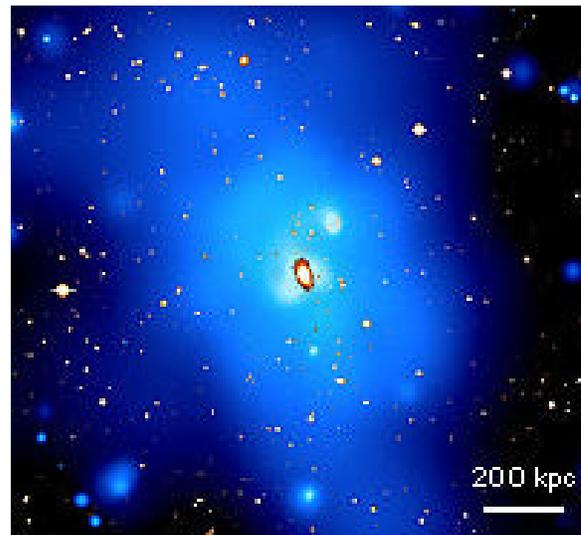
These interactions cause large galaxies to spiral slowly towards the centre of the group, where they can merge to form a single giant central galaxy, which progressively swallows all its neighbours.

If this process runs to completion, and no new galaxies fall into the group, then the result is an object dubbed a 'fossil group', in which almost all the stars are collected into a single giant galaxy, which sits at the centre of a group-sized dark matter halo. The presence of this halo can be inferred from the presence of extensive hot gas, which fills the gravitational potential wells of many groups and emits X-rays.

A group of international astronomers studied in detail the physical features of the most massive and hot known fossil group, with the main aim to solve a puzzle and understand the formation of massive fossils. In fact, according to simple theoretical models, they simply could not have formed in the time available to them!

The fossil group investigated, called 'RX J1416.4+2315', is dominated by a single elliptical galaxy located one and a half thousand million light years away from us, and it is 500 thousand million times more luminous than the Sun.

The XMM-Newton and Chandra X-ray observations, combined with optical and infrared analyses, revealed that group sits within a hot gas halo extending over three million light years and heated to a temperature of 50 million degrees, mainly due to shock heating as a result of gravitational collapse.



XMM-Newton observes fossil galaxy cluster

Such a high temperature, about as twice as the previously estimated values, is usually characteristic of galaxy clusters. Another interesting feature of the whole cluster system is its large mass, reaching over 300 trillion solar masses. Only about two percent of it in the form of stars in galaxies, and 15 percent in the form of hot gas emitting X-rays. The major contributor to the mass of the system is the invisible dark matter, which gravitationally binds the other components.

According to calculations, a fossil cluster as massive as RX J1416.4+2315 would have not had the time to form during the whole age of the universe. The key process in the formation of such fossil groups is the process known as 'dynamical friction', whereby a large galaxy loses its orbital energy to the surrounding dark matter. This process is less effective when galaxies are moving more quickly, which they do in massive 'clusters' of galaxies.

This, in principle, sets an upper limit to the size and mass of fossil groups. The exact limits are, however, still unknown since the geometry and mass distribution of groups may differ from that assumed in simple theoretical models.

“Simple models to describe the dynamical friction assume that the merging galaxies move along circular orbits around the centre of the cluster mass“, says Habib Khosroshahi from the University of Birmingham (UK), first author of the results. “Instead, if we assume that galaxies fall towards the centre of the developing cluster in an asymmetric way, such as along a filament, the dynamic friction and so the cluster formation process may occur in a shorter time scale,” he continues. Such a hypothesis is supported by the highly elongated X-ray emission we observed in RX J1416.4+2315, to sustain the idea of a collapse along a dominant filament.”

The optical brightness of the central dominant galaxy in this fossil is similar to that of brightest galaxies in large clusters (called 'BCGs'). According to the astronomers, this implies that such galaxies could have originated in fossil groups around which the cluster builds up later. This offers an alternative mechanism for the formation of BCGs compared to the existing scenarios in which BCGs form within clusters during or after the cluster collapse.

“The study of massive fossil groups such as RX J1416.4+2315 is important to test our understanding of the formation of structure in the universe,” adds Khosroshahi. “Cosmological simulations are underway which attempt to reproduce the properties we observe, in order to understand how these extreme systems develop,” he concludes.



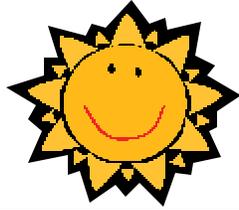
XMM-Newton

Source: http://www.esa.int/esaCP/SEMCFFOFGLE_index_0.html



May 2006

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2	3 UW Campus Observatory public viewing night	4 UW Astronomy Colloquium	5 	6 New Member Orientation Meeting Green Lake Star Party Paramount Park Star Party
7 Astrophot- ography/ Imaging SIG Meeting	8	9	10	11 UW Astronomy Colloquium	12	13  Amateur Telescope Makers SIG Meeting
14	15	16	17 SAS Meeting UW Campus Observatory public viewing night	18 UW Astronomy Colloquium	19	20 
21 Astrophot- ography/ Imaging SIG Meeting	22 SAS Board Meeting	23	24	25 UW Astronomy Colloquium	26 Riverside Telescope Makers Conference	27  Riverside Tele- scope Makers Conference Tiger Moun- tain/Poo Poo Point Star Party
28 Riverside Telescope Makers Conference	29	30	31			Texas Star Party Tiger Moun- tain/Poo Poo Point Star Party Open House at UW Astronomy



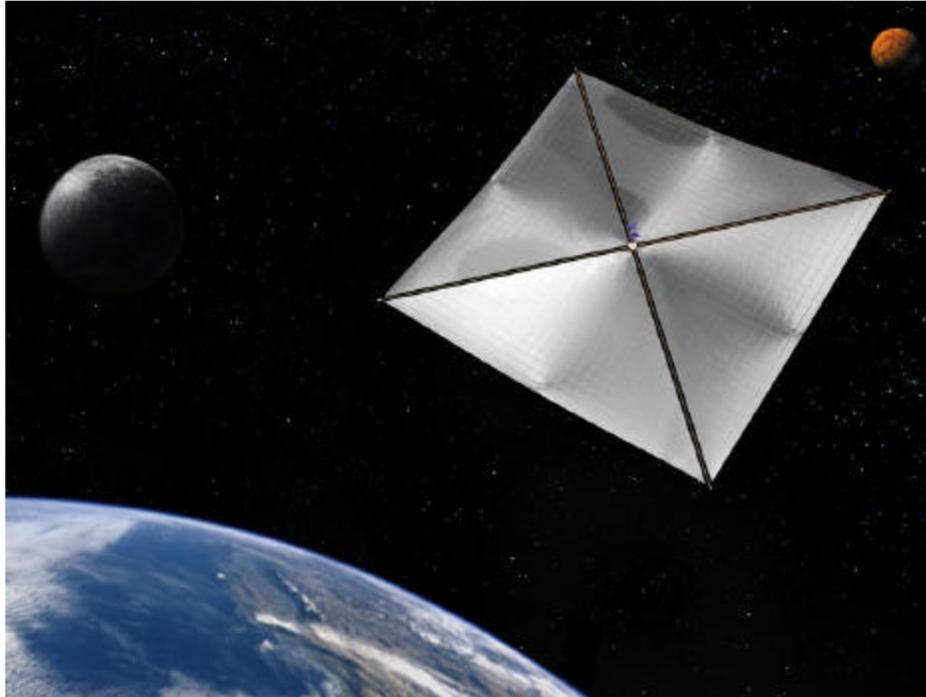
June 2006

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1 UW Astronomy Colloquium	2	3  Green Lake Star Party Paramount Park Star Party
4	5	6	7 UW Campus Observatory public view- ing night	8	9	10 Amateur Telescope Makers SIG Meeting
11 	12	13	14	15	16	17
18 	19	20	21 SAS Meeting UW campus Observatory public viewing night	22 Shingletown Star Party	23 Shingletown Star Party	24 Shingletown Star Party Tiger Moun- tain/Poo Poo Point Star Party
25 Shingletown Star Party	26 Shingletown Star Party SAS Board Meeting	27	28	29	30	

Who Wants to be a Daredevil?



[By Patrick L. Barry and Dr. Tony Phillips]



Artist's rendering of a four-quadrant solar sail propulsion system, with payload. NASA is designing and developing such concepts, a sub-scale model of which may be tested on a future NMP mission.

When exploring space, NASA naturally wants to use all the newest and coolest technologies—artificial intelligence, solar sails, onboard supercomputers, exotic materials.

But “new” also means unproven and risky, and that could be a problem. Remember HAL in the movie “2001: A Space Odyssey”? The rebellious computer clearly needed some pre-flight testing.

Testing advanced technologies in space is the mission of the New Millennium Program (NMP), created by NASA’s Science Mission Directorate in 1995 and run by JPL. Like the daredevil test pilots of the 1950s who would fly the latest jet technology, NMP flies new technologies in space to see if they're ready for prime time. That way, future missions can use the technologies with much less risk.

Example: In 1999, the program's Deep Space 1 probe tested a system called "AutoNav," short for *Autonomous Navigation*. AutoNav used artificial intelligence to steer the spacecraft without human intervention. It worked so well that elements of AutoNav were installed on a real mission, Deep Impact, which famously blasted a crater in Comet Tempel 1 on July 4, 2005. Without AutoNav, the projectile would have completely missed the comet.

Some NMP technologies "allow us to do things that we literally could not do before," says Jack Stocky, Chief Technologist for NMP. Dozens of innovative technologies tested by NMP will lead to satellites and space probes that are smaller, lighter, more capable and even cheaper than those of today.

Another example: An NMP test mission called Space Technology 9, which is still in the planning phase, may test-fly a solar sail. Solar sails use the slight pressure of sunlight itself, instead of heavy fuels, to propel a spacecraft. Two proposed NASA missions would be possible only with dependable solar sails—L1 Diamond and Solar Polar Imager—both of which would use solar sails to fly spacecraft that would study the Sun.

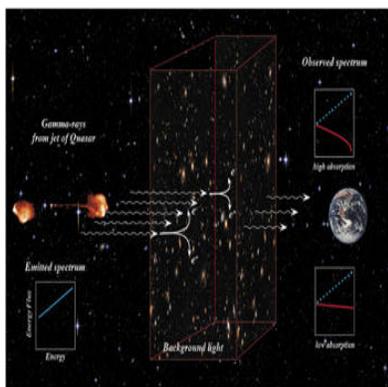
"The technologies that we validate have future missions that need them," Stocky says. "We try to target [missions] that are about 15 to 20 years out."

A menagerie of other cool NMP technologies include ion thrusters, hyperspectral imagers, and miniaturized electronics for spacecraft navigation and control. NMP focuses on technologies that have been proven in the laboratory but must be tested in the extreme cold, vacuum, and high radiation environment of space, which can't be fully recreated in the lab.

New NMP missions fly every year and one-half to two years, taking tomorrow's space technology for a daredevil test drive.

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

Space Bits



The Cosmos Does Not Glimmer As We Thought

All throughout space, a cosmic background light shimmers. Stars, galaxies - all kinds of sources - contribute to it; the light is their leftovers, in fact. Now, astrophysicists have discovered that this light is hardly as intense as anyone had guessed. The researchers used two distant quasars as "probes", and recorded their gamma spectra using the H.E.S.S. telescopes in Namibia. These spectra turned out to be just a bit reddened; the background light seemed to only lightly obfuscate the

quasars' radiation. These observations do not just shed light on the background light - but on topics as great as the birth and development of galaxies (Nature, April 20, 2006).

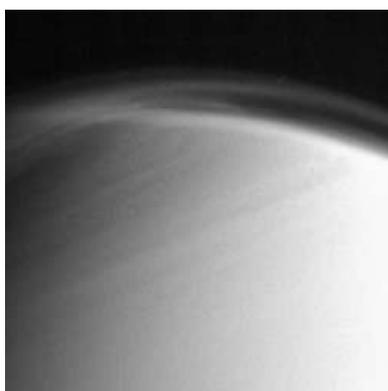
Link: <http://www.mpg.de/english/illustrationsDocumentation/documentation/pressReleases/2006/pressRelease20060508/index.html>



NASA Agrees To Cooperate With India On Lunar Mission

NASA will have two scientific instruments on India's maiden voyage to the moon. Tuesday, NASA Administrator Michael Griffin and his counterpart, Indian Space Research Organization Chairman G.

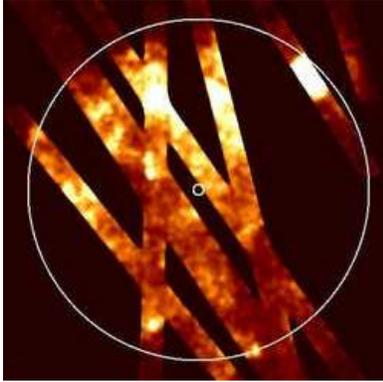
Link: <http://www.sciencedaily.com/releases/2006/05/060510093104.htm>



Shifting Northern Hazes on Titan

Wed, 03 May 2006 - This beautiful photograph shows how the hazy atmosphere on Saturn's moon Titan is broken up into many layers. Titan's north pole is at the upper left in this picture. Cassini took this image on March 16, 2006 when it was approximately 1.2 million kilometers (800,000 miles) from Titan.

Link: http://www.universetoday.com/am/publish/northern_shifting.html?352006



XMM-Newton Finds Objects in its Spare Time

For most of its time, ESA's XMM-Newton observatory is staring intently at a single object. But astronomers have figured out how to use the time the observatory spends turning from object to object - called "slewing". Over the past 4 years, the observatory has actually imaged 25% of the sky in this way. A newly released sky survey contains this "spare time" data, which includes thousands of objects, many of which were previously unknown.

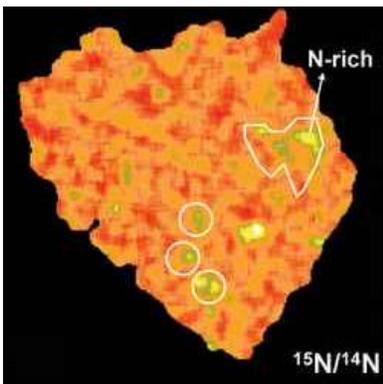
Link: http://www.universetoday.com/am/publish/xmm_newton_sparetime.html?452006



Measuring a Day on Saturn

With solid planets, like the Earth and Mars, it's easy to track the length of their days. Just watch for a surface feature to rotate into view again. With gas giants, however, it's a tricky business. Scientists have used features of Saturn's magnetic field to act like objects on its surface; tracking the amount of time it takes for that point in the magnetic field to rotate around again. Cassini has determined that Saturn's day is 10 hours, 47 minutes, 6 seconds (+- 40 seconds).

Link: http://www.universetoday.com/am/publish/saturnian_day.html?552006



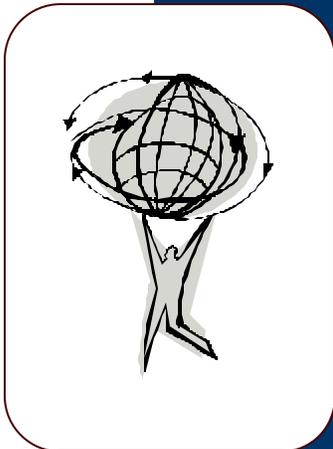
New Technique for Finding Organic Molecules in Meteorites

When the Solar System first formed billions of years ago, organic molecules - the building blocks of life - were churned into the mix that went on to create the planets. Scientists from the Carnegie Institution have developed a technique to find these tiny organic particles hidden inside meteorites. These meteorites have survived since the formation of the Solar System, so it allows scientists to track the distribution of organic material and the processes they went through as the planets formed.

Link: http://www.universetoday.com/am/publish/carnegie_meteorites_nitro.html?552006

We promise you the sun, moon and stars and we deliver...

The Seattle Astronomical Society is an organization created and sustained by people who share a common interest in the observational, educational, and social aspects of amateur astronomy. Established in 1948, the SAS is a diverse collection of over 200 individuals. A variety of programs and activities is presented by the SAS throughout the year. Monthly meetings feature speakers on a wide range of topics, from the Hubble Space Telescope to electronic imaging to personal observing experiences. The club holds public observing "star parties" at Green Lake every month, dark sky observing parties outside Seattle, plus such activities as meteor watches, public telescope and astronomy displays, National Astronomy Day, and an annual Awards Banquet.



We're on the Web!
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