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### SCAS Officers for 2005

**Bill Brown**.....President  
Ph # 549-2683 or 583-0354  
e-mail:

[william.brown@colostate-pueblo.edu](mailto:william.brown@colostate-pueblo.edu)

**Klaus Priebe**.....Vice-President  
Ph # 545-3931 Cell # 240-0020  
e-mail: [kpphoto7@hotmail.com](mailto:kpphoto7@hotmail.com)

**Walt Russell**.....Treasurer  
Ph # 263-5483  
e-mail: [wdrussell1@juno.com](mailto:wdrussell1@juno.com)

**Doug Knight**.....Secretary  
Ph # 547-3214

e-mail: [dknight5@mindspring.com](mailto:dknight5@mindspring.com)

**Mike Verry**....Member-at-Large  
Ph # 547-7957  
e-mail:

[rmacmikebrdmbr@yahoo.com](mailto:rmacmikebrdmbr@yahoo.com)

### Upcoming SCAS Events

#### Club Star Watch

04/09 N. Fishing area #1, Directions at end of newsletter.

The following To be announced:

05/07 , 06/04 , 07/09 , 08/06 , 09/03 ,  
10/01 , 11/05 , 12/03

#### Public Star Watch

At the Raptor Center & CSUP Observatory.

05/14 , 06/11 , 07/16 , 08/13 , 09/10 ,  
10/08 , 11/12 , 12/10

### Observing Request

If anyone is interested in trying some astrophotography or would just like to get out and do some viewing, please contact Klaus Priebe at 719-240-0020 or e-mail me at [kpphoto7@hotmail.com](mailto:kpphoto7@hotmail.com) . Thanks!  
Klaus



April 2005



Volume # 4 Issue # 04



# STARS & SCOPES



The Newsletter of the  
Southern Colorado Astronomical Society (SCAS)

Web site : [www.rmastronomy.info](http://www.rmastronomy.info)



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Picture top left courtesy of : <http://antwarp.gsfc.nasa.gov/apod/archivepix.html>

Picture top left : The Pleiades Star Cluster

Credit & Copyright: David Malin (AAO), AATB, ROE, UKS Telescope

Welcome and greetings from the SCAS Board & Editor. Regular SCAS Meetings start at 7 PM and meet in the **Physics/Math Building room #103**. SCAS meet every second Monday of the month.

### NASA – Pluto's horizon

<http://www.nasa.gov/missions/solarsystem/newhorizons-eis.html>

In March 1930 the Lowell Observatory in Arizona announced the discovery of a small, odd world roaming beyond the known planets in a region barely visible through the most powerful telescopes.

Seventy-five years later that historic find, Pluto, remains almost as much of a mystery as it was then. No spacecraft has ever visited it. and not even the Hubble Space Telescope can spot details on its rocky, icy surface. Yet with the New Horizons mission, now in development and planning for liftoff January 2006 from Launch Complex 41 at the Kennedy Space Center, NASA looks to unlock one of the solar system's last, great planetary secrets.

After launch aboard an Atlas V, New Horizons would cross the entire span of the solar system in record time and conduct flyby studies of Pluto and its moon, Charon. in 2015. The seven science instruments on the piano-sized probe would shed light on the bodies' surface properties. geology. interior makeup and atmospheres.

It would mark humankind's first voyage into the "third zone" of the solar system known as the Kuiper Belt, populated by smaller, icy objects different than the rocky inner planets or the outer gas giants. The power source for the spacecraft, a radioisotope thermoelectric generator (RTG), uses heat from the decay of plutonium dioxide to produce electricity.

### Science News 03/26/05 Vol 167 #13 by David Shiga, article title "Jupiter as mirror for the sun's X rays"

Scientists have tracked down the source for the X rays that stream from Jupiter's midriff. Rather than deriving from the planet itself, those X rays arise in the sun and are reflected by the giant planet's atmosphere, the researchers found.

Continued on page 2.

### CSUP Observatory Open House

Open house will continue on Tuesdays nights.

About 1 hour after sunset.

Directions: Take Pueblo Blvd. to 11th street. Turn west on to 11th street. About 0.6 mile & at the top of the hill turn left into the Raptor Center Parking lot.

At the end there is a trail leading up to the Observatory. Please take a flashlight with you.

The observatory is run by volunteers & they may not be there always on time. Please be patient.

The Observatory will not open during high winds (over 20 mph), rain, overcast, & snow.

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### Celestial Events

04/08/05 partial solar eclipse. 20% totality fo CO.

Lyrind shower April 21/22

Lunar Phases – 4<sup>th</sup> quarter

04/02/05, new 04/08/05, 1<sup>st</sup> quarter

04/16/05, full 04/24/05.

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### For a list of all Star Parties goto:

<http://skyandtelescope.com/resources/calender>

### Regional Star Parties

Texas Star Party

05/01 to 05/08

[www.texasstarparty.org](http://www.texasstarparty.org)

Desert Sunset Star Party

05/04 to 05/08

<http://chartmaker.tripod.com/sunset.html>

Death Valley Star Party

05/06 to 05/07

[www.furnacecreekresort.com](http://www.furnacecreekresort.com)

### Other Astronomy Organizations

CO Springs Astronomical Society

[www.csastro.org](http://www.csastro.org)

Denver Astronomical Society

[www.denverastrosociety.org](http://www.denverastrosociety.org)

Longmont Astronomical Society

[www.longmontastro.org](http://www.longmontastro.org)

Northern CO Astronomical Society

[www.ncastro.org](http://www.ncastro.org)

Western CO Astronomical Club

[www.coloradowestastronomy.org](http://www.coloradowestastronomy.org)

**For complete list of all astronomical organizations goto:**

[www.amsky.com/whitepages](http://www.amsky.com/whitepages)

*"Jupiter as mirror for the sun's X rays" Continued from page 1.*

"It's a very small proportion of the solar X rays which are reflected, but [they] can be seen by sophisticated instruments," says study leader Anil Bhardwaj of NASA's Marshall Space Flight Center in Huntsville, Ala.

Using data from two satellites, XMM-Newton and TIMED, the researchers compared X-ray measurements of Jupiter and the sun over a 3-day period in November 2003. They found that fluctuations in solar X rays were followed by fluctuations in the X rays emanating from Jupiter, with a delay of 2 hours and 20 minutes. That's just the time it took sunlight to travel to Jupiter, bounce off, and reach Earth on those days. X rays and light travel through space at the same speed.

A gradual increase in the sun's X-ray output over the 3 days was mirrored in the X-ray intensity of Jupiter's equatorial regions. A spike in the sun's X-ray output from a solar flare on the third day was also matched by Jupiter X rays. Astronomers could take advantage of this effect to observe solar flares that would otherwise not be visible from Earth. When flares erupt on the side of the sun not visible from Earth, their X rays could still be detectable if they reflected off Jupiter toward Earth.

*Science News 04/02/05 Vol 167 #14 by David Shiga, article title "Leak Locator – Ultrasound for finding holes in spacecraft."*

After the International Space Station (ISS) started losing air pressure in January 2004, astronauts hunted for 2 weeks before finding the leak near a porthole. Though it worried mission controllers, the leak never endangered the people on board. Since then, NASA's been searching for a fast way to find such leaks. Now, NASA-funded researchers have discovered that listening for high-frequency sound waves rippling through a spacecraft's hull can do that job.

The metal skin of the ISS is constantly threatened by micro-meteorites and by debris from previously launched satellites and spacecraft. Zipping toward the station as fast as 15 kilometers per second, even a millimeter-size fragment can punch a hole through the hull. The handheld, industrial-type leak detector that astronauts currently rely on detects hissing sounds in the air. When there's a leak into the surrounding vacuum, how-ever, most of the sound is whisked out of the spacecraft with the air.

Stephen D. Holland and his team at Iowa State University in Ames focused on the sound that gets trapped inside the aluminum skin of the spacecraft. Their new leak-detection system employs microphones attached to various points on the metal surface. When a computer combines the data from each microphone, patterns emerge that pinpoint a leak.

In each trial, Holland's group drilled a millimeter-wide hole in an aluminum sheet similar to the sheets that make up the hull of the space station. The researchers then created a vacuum on one side of the sheet. With their system of microphones in various configurations, they located the leak in every test.

"The technique appears to work quite well," says acoustics researcher Todd W. Murray of Boston University. "It seems that the next task will be in outfitting a space-craft with a sensor system?" He points out that reflections of ultrasound near edges could make the processing more difficult.

Holland's group has developed several variations on the skin-listening approach, using anywhere from 2 to 256 microphones, and the researchers are testing which arrangement is best suited for installation on the space station. Sophisticated leak-detection systems of this type could also be built into future spacecraft, Holland says.

Stars and Scopes  
1580 N. Cheshire Dr.  
Pueblo West CO 81007

Editor – Michael Verry  
Ph # 719-547-7957  
e-mail  
[rmacmikebrdmbr@yahoo.com](mailto:rmacmikebrdmbr@yahoo.com)

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Binocular & Small Telescope  
Objects -- Late  
Winter  
M 44, 67 in Cancer  
M 48 in Hydra  
M 40, 81, 82, 97, 101, 108, 109  
in Ursa Major  
M 65, 66, 95, 96, 105 in Leo  
M 3, 51, 63, 94, 106 in Canes  
Venatici

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— Directions —  
— RMAC Meetings —  
Take Hwy. 47 to CSUP, Pueblo,  
CO. In the technology building,  
room 244 at 6:00 pm for Board  
meetings and 7:00 pm for club  
meetings. The technology  
building is next to the radio  
station.

— Raptor Center —  
Directions: Take Pueblo Blvd.  
to 11th street. Turn west on to  
11th street. About 0.6 mile &  
at the top of the hill turn left into  
the Raptor Center Parking lot.  
Please take a flashlight with  
you.

— So. Fishing Area —  
From Pueblo Blvd., turn west  
on Hwy. 96 (toward  
Wetmore) and travel about 10.6  
miles. Sign lake pueblo state  
park on right Make a right turn.  
Stay on the paved road for 1.6  
miles and take it till it ends.

— Graneros Gorge —  
From Pueblo, take I25 south to  
exit 71 Graneros Road. (Next  
exit past Colo. City.) Go over  
interstate & make left (north) on  
the frontage road. Pavement  
ends, make right over cattle  
guard onto dirt (&bumpy) road  
stay right, go 1 mile, road ends  
in a cul-de-sac.

*BBC News Science/Nature – Astronomers expect to be 'Dazled'*  
[Http://news.bbc.co.uk/1/hi/sci/tech/4418131.stm](http://news.bbc.co.uk/1/hi/sci/tech/4418131.stm)

UK and Australian astronomers are about to use a new instrument to detect the most distant galaxies yet observed. Dazle is tuned to search for specific infrared wavelengths of light that should be associated with some of the first stars to shine in the Universe. The instrument will be fitted to the 8m Melipal Very Large Telescope at Paranal in Chile.

University of Cambridge researchers said they hoped to see stars that were more than 12 billion light-years away - stars which may have played a crucial role in altering the entire cosmic environment.

"These observations are very difficult and previous attempts to look back this far have so far been unsuccessful, so Dazle could be groundbreaking," said Dr Richard McMahon, from the Institute of Astronomy. Dazle stands for Dark Age Redshift Lyman Explorer. The instrument must be cooled to -40 Celsius and will sit inside a large freezer box.

The higher the redshift number assigned to an object, the more distant it is and the earlier it is being seen in cosmic history. Current technologies on the best telescopes are seeing out to redshifts of six-plus. Dazle, when it analyses the light captured by the Melipa telescope, expects to start out with observations that have a redshift of 7.8.

"That takes us back 12.8 billion years and that's 650 million years after the Big Bang," Dr McMahon told the BBC News website.

The research is part of the major drive in astronomy now to tie down the timings of key events in the early Universe. Scientists would like to see evidence of the first generation of stars.

These hot, blue giants would have grown out of the cold neutral gas that pervaded the young cosmos just a few hundred million years after the Big Bang. It is believed that when these blue stars switched on, they brought to an end a period of darkness; and also "fried" the neutral gas to produce the diffuse intergalactic plasma we detect between nearby stars today.

"There are two ways of working in astronomy," commented Dr Andrew Bunker from Exeter University, who also studies high-redshift galaxies. "You can either do 'archaeology': you can measure ages of stars and infer when they formed; or through the miracle of Hubble expansion and being able to look back in time, you can try to catch them in the act of being born. That's what Dazle will do."

The Dazle instrument in its current form expects to see a redshift eventually of 8.8, equivalent to a distance of 12.9 billion light years. But, says Dr McMahon, there is every reason to believe the technique on which it depends could get out to redshifts in the region of 15, just a little under 300 million years after the Big Bang.

This will require some extra technologies, though, and these may not come until we also get the proposed new giant telescopes in the next few decades. These facilities would have tremendous power, gathering light on mirrors that are 100m across.

**The Stargate Observatory**, located in Canon City, CO and owned by RMAC member Steve Abraas. The observatory houses a Sky Watcher 6-inch refractor with an 80mm finder scope and a Meade ETX-105, which Steve uses as a photographic tool while he guides through his refractor. RMAC members can contact Steve as [abraas610@netzero.net](mailto:abraas610@netzero.net) and can visit his website at [www.Stargateobservatory.com](http://www.Stargateobservatory.com). The observatory is open to other RMAC members for celestial viewing. His website contains information on the observatory and some images he has taken.

*NASA – Flashes in the Sky: Scientists Trace Effects of Lightning Thousands of Miles into Space*  
[http://www.nasa.gov/vision/universe/solarsystem/lightning\\_in\\_space.html](http://www.nasa.gov/vision/universe/solarsystem/lightning_in_space.html)

The mysteries of lightning never cease to surprise and amaze us. From the first time we heard of Benjamin Franklin's experiments with lightning, we were hooked. In fact, it was just about 10 years ago that the most exciting and enigmatic facets of lightning, sprites and jets that shoot up 50 miles into our atmosphere were discovered! Now scientists at NASA release surprising new studies that show the impacts of lightning extend much further than previously believed. Red sprites travel from the tops of clouds to as high as the ionosphere, 90 km above the Earth's surface and last a fraction of a second.

When lightning makes your favorite AM radio station crackle and pop, it is also cleaning up a radiation hazard overhead. Lightning in clouds only a few miles above the ground clears a safe zone in the radiation belts thousands of miles above the Earth, according to new NASA research.

The safe zone appears as a gap between the inner and outer 'donut,' beginning about 7,000 km (4,350 miles) and ending about 13,000 km (8,110 miles) above the Earth's surface. Radio waves from lightning travel along the Earth's magnetic field and intercept particles in the safe zone region of the Van Allen Belts. The radio waves deflect particles there, causing them to stream down the magnetic field line and impact Earth's upper atmosphere. This process occurs again until the safe zone is clear.

A great mystery was set in motion a few years ago when a spacecraft designed to measure gamma-ray bursts, the most powerful explosions in the Universe, found that Earth was actually emitting some flashes of its own. Named Terrestrial gamma-ray flashes (TGFs), these very short blasts of gamma rays lasting about one millisecond, are emitted into space from Earth's upper atmosphere. Scientists believe electrons traveling at nearly the speed of light scatter off of atoms and decelerate in the upper atmosphere, emitting the TGFs.

### **RMAC Board Highlights**

RMAC Board Meeting highlights: 1) The club has applied to the Astronomical League and is waiting for confirmation. 2) The club has sent in for an insurance quote and is waiting for a reply.

The next Public Star Watch, on May 7<sup>th</sup>, will be at the Raptor Center Parking Lot and at the CSUP Observatory. Start time at least an hour after sunset. Viewing gets better after the twilight.

The next Club Star Watch, on April 9<sup>th</sup>, will be at the N. Fishing Area #1, a new location to be tried out by the club members. Start time at least an hour after sunset. Viewing gets better after the twilight.

Directions to N. Fishing Area #1: from Pueblo take Hwy 50 west to McCulloch Blvd. Turn south on McCulloch Blvd. About 5 1/4 miles, there is a green sign indicating the entrance to Lake Pueblo State Park, turn south on Nicholas Road. Just before the park entrance make a right hand turn onto a dirt road. This road also leads to Turkey Creek. Stay to the left after the going over the bridge, then stay on the main road till it ends, about 2 miles. This area also is good viewing of any eagles that happen to be around and the nesting poles are within view. There is a restroom facility at this area. If you have any questions with the directions, feel free to contact me, Michael Verry 547-7957. I may have better distances later this week.

### **PLANET & OTHER OBJECT HIGHLIGHTS.** *(Information from Astronomy Magazine)*

Saturn is at a mag of 0.1 and will present good viewing of it's rings. Saturn is past opposition and the shadow is visible on the rings. Jupiter shines at a mag of -2.5 and is visible all night 14<sup>th</sup> mag Pluto rises around 10 pm and is best hunted for around 3 am. Mars rises around 1 am. and shines at a mag of 0.8. Neptune is at a mag of 7.9 and can be seen in the early morning hours.

#### **A Call for Newsletter Submissions**

If you would like to contribute an article, observing report, astro-photo, etc. to be published in the Stars and Scopes Newsletter, then submit them to Michael Verry, 1580 N. Cheshire Dr., Pueblo West CO 81007 or e-mail them to [rmaemikebrmmbr@yahoo.com](mailto:rmaemikebrmmbr@yahoo.com). When sending photos, please send them in JPG format and as large as possible. Please note that I can scan photographs, negatives and slides. I will return your photo/slide/negative. If you would like to see something in the newsletter or would something changed, submit your request.

The dues for RMAC are as follows: Individual member - \$18.00/yr, Family member - \$20.00/yr. Dues are pro-rated for new members by the quarter year. Regular member dues are due at the beginning of the year. Contact one of the Board members on page one for more information.

The Lyrid meteor shower peaks on April 21/22 and has a full moon to contend with. Comet Machholz is at a mag of 7 and look for it about halfway between Polaris and the bowl of the Big Dipper. This comet is seen with binoculars. Look for the tail.

*Scientific American, October 2004, Vol. 291, #4, Article title "A Universe of Disks" by Omer Blaes Part 4 of 4. Oscillations and Jets*

Given that many accretion disks are thought to contain very turbulent flows, it is hardly surprising that observations show a high degree of variability in their output of radiation. The variations are usually random and chaotic, but there is occasionally order within the chaos. Intriguing, inexplicable patterns in the light output occur over and over again, and oscillations with reasonably well defined frequencies are sometimes evident. The Rossi X-ray Timing Explorer, a satellite that can measure rapid changes in x-ray brightness, has significantly aided the study of oscillations in accretion disks around neutron stars and stellar-mass black holes (those with a mass four to 15 times as great as the sun's).

Astrophysicists do not know what causes these variability patterns or the oscillation frequencies. An exciting possibility, proposed by Robert Wagoner of Stanford University and others, is that the oscillations reflect discrete modes of vibration of the disk, very much like the harmonics of a violin string. And just as the notes produced by a violin string can reveal the string's tension and mass, the observed frequencies of an accretion disk might be able to tell us about the disk's structure and the space-time around the neutron star or black hole.

Although much of the gravitational binding energy released by the spiraling material in accretion disks ends up in the form of radiation, sometimes the energy also drives winds and jets of particles from the disk. Astronomers are intently exploring how such outflows are generated and what determines the partitioning of accretion power into radiative and kinetic luminosity. In all likelihood, different types of disks have different mechanisms for expelling particles. In some cases, the outflows probably wield a controlling influence on the accretion disk, because they carry not only mass and energy outward but perhaps significant amounts of angular momentum as well.

One possible driving mechanism for some types of outflows is pressure from the photons that are produced by the accretion disk. Even though photons have zero rest mass, they still carry momentum. When photons scatter off material, they exchange momentum with the particles they hit and thereby exert a force on them. Ultraviolet photons radiating from young massive stars are known to drive particle winds outward by scattering off the atoms and ions surrounding the star. In the same way, ultraviolet photons from accretion disks around white dwarfs and in active galactic nuclei or quasars may also accelerate winds from the disk.

Some systems, such as young stars and certain classes of active galactic nuclei, produce very fast, narrow jets of particles extending up to several light-years in the case of young stars and to more than several million light-years for active galactic nuclei. The fact that these jets remain collimated in a narrow beam over such great distances suggests that magnetic fields may be involved.

(Astronomers have also inferred the presence of such fields in active galactic nuclei from their effects on the polarization of radio waves.) Because the accretion disk itself is believed to be magnetized, the rotation of the disk can twist the magnetic field lines into a helix. Tension in the field lines that spiral around a jet of particles can help confine it. Back in the 1980s, Roger Blandford and David Payne of the California Institute of Technology suggested that the rotation of the disk may also help fling material outward along the field lines, providing the initial acceleration and mass loading for the jet. Unfortunately, we do not yet know how to relate the inward accretion flow in the disk, with its complex MRI turbulence, to the apparently more ordered field structure in a jet outflow. But the rapid progress we are making in studying the magnetic fields in accretion disks may help us crack these kinds of problems.

Astrophysicists have spent decades trying to figure out how accretion disks work, and now we believe we have a basic understanding of these systems. As we investigate how magnetic turbulence operates in different environments, we hope to someday comprehend the remarkable variety of phenomena these spinning disks exhibit. It was an accretion disk that gave birth to our solar system, so unraveling the dynamics of these fascinating objects may ultimately help explain how we came to be.

[Http://www.jpl.nasa.gov/news/news.cfm?release=2005-055](http://www.jpl.nasa.gov/news/news.cfm?release=2005-055)

*JPL.NASA.GOV : News Release – Durable Mars Rovers Sent Into Third Overtime Period*

NASA has approved up to 18 more months of operations for Spirit and Opportunity, the twin Mars rovers that have already surprised engineers and scientists by continuing active exploration for more than 14 months.

The rovers have already completed 11 months of extensions on top of their successful three-month prime missions. "We now have to make long-term plans for the vehicles because they may be around for quite a while," said

Jim Erickson, rover project manager at NASA's Jet Propulsion Laboratory, Pasadena, Calif.

Opportunity is within a few football fields' length of a region called "Etched Terrain," where scientists hope to find rocks exposed by gentle wind erosion rather than by disruptive cratering impacts, and rocks from a different time in Mars' history than any examined so far. "This is a journey into the unknown, to something completely new," said Dr. Steve Squyres of Cornell University, Ithaca, N.Y., principal investigator for the rovers' science instruments.

To reach the Etched Terrain, rover planners have been pushing the rover fast. Opportunity has overtaken Spirit in total distance driven. It has rolled more than 4.9 kilometers (3 miles) -- eight times the original goal. On March 20, Opportunity also set a new Martian record of 220 meters (722 feet) in a single day's drive. Drive-distance estimates can vary by a few percent. Also, Opportunity's solar panels, though now dustier than Spirit's, still generate enough power to allow driving for more than three hours on some days.

Spirit is in much rougher terrain than Opportunity, climbing a rocky slope toward the top of "Husband Hill." However, with a boost in power from wind cleaning its solar panels on March 9 and with its formerly balky right-front wheel now working normally, Spirit made some longer one-day drives last week than it had for months.

The jump in power output has taken some urgency out of Spirit's southward climb. With Mars now beginning southern-hemisphere spring, the Sun is farther south in the sky each day. If not for panel-cleaning, Spirit might be facing the prospect of becoming critically short of power if still on the north-facing slope by early June.

Both rovers do have some signs of wear and exposure. Spirit's rock abrasion tool shows indications that its grinding teeth might be worn away after exposing the interiors of five times more rock targets than its design goal of three rocks. Researchers probably won't know the extent of wear until Spirit's next rock-grinding attempt, which may be weeks away. Also, troubleshooting continues for determining whether Opportunity's miniature thermal emission spectrometer is still usable despite tests indicating a problem last month. All other instruments on both rovers are still working normally.