



Saturn by Three
Credit: E. Karkoschka (Univ. Arizona), NASA

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STARS & SCOPES

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Web site : www.rmastronomy.org
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RMAC Officers for 2004
Phil Brown.....President
Ph # 564-2765
e-mail: pdndbrown@msn.com
Bill Brown.....Vice-President
Ph # 549-2683 or 583-0354
e-mail:
william.brown@colostate-pueblo.edu
Walt Russell.....Treasurer
Ph # 263-54583
e-mail: wdrussell1@juno.com
Bob Adams.....Secretary
Ph # N/A
e-mail: bovi9@aol.com
Mike Verry....Member-at-Large
Ph # 547-7957
e-mail: rmacboardmem5@juno.com

Picture top left courtesy of : <http://antwarp.gsfc.nasa.gov/apod/archivepic.html>
Picture top left : Saturn by Three
Credit: E. Karkoschka (Univ. Arizona), NASA

Welcome and greetings from the RMAC Board & Editor.
Regular RMAC Meetings meet in room # 242.

Venus will transit the Sun on 06/08/04 and on 06/06/12. The 06/08/04 event will not be viewable from our area. It is still interesting to watch Venus become a smaller and smaller crescent. On 06/16/04, Venus can be seen in the morning 30 minutes before sunrise. Now Venus' crescent disk will grow larger and will climb higher in the sky. By the end of the month it will be 12° above the eastern horizon, at a mag of - 4.4.

Launched on 10/15/1997, the Cassini spacecraft will arrive at Saturn next month. For four years the craft will explore Saturn & Saturn's moons. The Huygens Probe will examine Titan from the moon's surface.

Science News 05/22/04 vol165 #21, article title: "Old Stars: Even Older: Determining a new age for the universe." by R. Cowen

Using particle accelerators to mimic the conditions inside stars, two independent research groups have found evidence that the most-ancient known stars are about a billion years older than astronomers had estimated. This provides new evidence that the universe is about 14 billion years old.

The age recalibration rests on a nuclear reaction that prevails in old stars that have nearly exhausted the hydrogen at their cores. For most of its life, a star produces energy by fusing hydrogen nuclei to make helium. The fusion occurs at a leisurely rate, but when little hydrogen is left, the star activates an alternative helium-making process, which is based on collisions between protons and nuclei of carbon, nitrogen, and oxygen.

The speed of this process depends on the slowest reaction in the chain: the collision between a proton and a nitrogen-14 nucleus. By studying this collision at energies approaching those of the interior of stars a feat never before accomplished the two teams have found that the reaction proceeds only half as fast as had been estimated. The reaction's sluggishness enables gravity to shrink a star more than it otherwise would, which makes the star brighter. Because astronomers use brightness to determine an elderly star's age, the newly determined reaction rate adds another billion years to the senior citizens of the cosmos.

The finding is important because it pushes back the formation of the first stars. The new age determination is in line with observations from the Wilkinson Microwave Anisotropy Probe, which recently found that the universe is 13.7 billion years old.

Upcoming RMAC Events
Club Star Watch
June 19th at Graneros Gorge
July 17th, Aug. 14th,
Sept. 18th, Oct. 16th,
Nov. 13th
To be determined.
Public Star Watch
June 12th, July 10th,
Aug. 07th, Sept. 11th,
Oct. 09th, Nov. 06th,
Dec. 11th
At the Raptor Center &
CSUP Observatory.

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.

Celestial Events

June 08, 2004
Watch for a transit of Venus, observers in N. America will only be able to view the end of the event at sunrise. Not visible in the Western US..

October 28, 2004
Total Lunar Eclipse, this event will have good viewing for N. America.

Regional Star Parties

June 12-19, 2004
Grand Canyon Star Party, at Yavapai Point. For more information go to:
www.tusconastronomy.org/gcsp.html

Science News 05/22/04 vol165 #21, article title: "Windy Endeavor." by R. Cowen

Last month, a satellite closed its doors after more than 2 years of collecting ions from the relentless stream of particles that travels outward from the sun. Now, the craft must send the samples home.

Known as Genesis, the craft collected the ions on wafers made of ultrapure gold, silicon, sapphire, and diamond. "With data from this mission, we'll be able to say what the sun is composed of at a level of precision ... that has never been seen before," says Genesis lead scientist Don Burnett of the California Institute of Technology in Pasadena.

Getting the solar booty into the hands of Burnett and his col-leagues will require an extraordinary maneuver that pilots have already begun rehearsing. On Sept. 8, if all goes according to plan, the spacecraft will release its sample-return capsule, which will then parachute through Earth's atmosphere. A helicopter will snatch the capsule in midair using custom-designed hooks. The solar material will be the first samples that NASA retrieved from space since the Apollo 17 astronauts carried moon rocks to Earth in 1972.

M&M's pack more tightly & efficiently than spheres when randomly packed. Squashed or stretched spheres pack together more tightly, about 10% more efficiently. Spheres, pack randomly, fill a container about 64% and when placed to their maximum, they are about 74%. M&M's pack to 73.5%. Spheres can only have a maximum of 6 touching neighbors. Squashed or stretched spheres or M&M's can have up to 11 touching neighbors.

Science News 04/17/04 vol165 #16, article title: "Rare Passage: Crab's X rays probe Titan." by R. Cowen

While observing a rare celestial alignment, astronomers made the first X-ray measurement of the atmosphere of Titan, Saturn's most tantalizing moon. Titan is the only moon in the solar system known to have an atmosphere, and the new study suggests that its atmosphere could be bigger than previous observations had indicated. Scientists preparing for the robotic Cassini mission, scheduled to begin touring Saturn and its moons this July, are paying close attention to the findings for guidance on the craft's flight plan.

On Jan. 5, 2003, Titan passed in front of an X ray - spewing supernova remnant known as the Crab nebula. During that transit, some of the Crab's X rays were absorbed by Titan's atmosphere. Koji Mori of Pennsylvania State University in State College and his colleagues captured the transit with NASA's orbiting Chandra X-ray Observatory.

From characteristics of the orbits of Titan and Saturn, Mori's team calculates that the 2003 event is the first time Titan has passed in front of the Crab nebula, which is only 950 years old. This transit is much less common than the upcoming passage of Venus in front of the sun.

The team's study reveals that the upper reaches of Titan's atmosphere, the region that absorbs X rays, may extend as far as 880 kilometers above the moon's surface. If the finding holds up, it would indicate that Titan's atmosphere is 10 to 15 percent larger than it was in 1980 when the Voyager 1 spacecraft recorded radio, infrared, and ultraviolet data there.

With the Cassini spacecraft fast approaching Saturn, scientists want to keep it from encountering unexpected drag or torque from Titan's atmosphere. During its 4-year tour, Cassini will skim Titan's atmosphere some 44 times, both to study the moon and to get gravity boosts to help the craft stay on course.

If Titan's atmosphere indeed extends farther than previously measured, Cassini may have to fly at a slightly higher altitude above Titan than currently planned, says mission scientist Roger Yelle of the University of Arizona in Tucson. The newly determined traits of the upper atmospheres won't affect the descent in January 2005 of a packet of instruments that Cassini will release into Titan's atmosphere. Continued on page 3.

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

Editor
Michael Verry
Ph # 719-547-7957
e-mail
rmacboardmem5@juno.com

Binocular & Small Telescope
Objects
Late Spring
M 49, 58, 59, 60, 61, 84, 86,
87, 89, 90, 104 in Virgo
M 46 in Hydra
M 53, 64, 85, 88, 91, 98, 99,
100 in Coma Berenices

“Rare Passage: Crab's X rays probe Titan.” Continued from page 2.

Most of the braking action for this delivery to the moon's surface will occur in the lower atmosphere.

Combined with previous studies, which indicate that Titan's lower atmosphere hasn't changed significantly since Voyager 1 flew past the moon, the new findings suggest that Titan's upper atmosphere is bigger, denser, and about 60 kelvins warmer than it was in 1980.

Cassini researcher Darrell F. Strobel of Johns Hopkins University in Baltimore suggests that the upper atmosphere's temperature could be influenced by Saturn's magnetosphere. This vast magnetic bubble shields the planet from bombardment by the sun's wind of charged particles. In 1980, Titan resided within Saturn's magnetosphere, but it may not have been protected in that way in 2003. If Titan was outside the magnetosphere, its atmosphere would have been heated by energetic particles in the solar wind, Strobel says.

Scientific American, June 2004, article title “Eye on the Junk: Space Station noises renew worry about orbital debris.” by Phil Scott

Last November cosmonaut Alexander Kaleri was onboard the International Space Station (ISS) when he heard a loud bang. Kaleri didn't believe the sound was from balky equipment; rather it seemed to originate from outside. This past April the ISS crew reported hearing a similar clang. NASA has doubts whether the sounds really came from space junk hitting the station. But the noises have engineers paying renewed attention to the threat of orbital debris, which can act as missiles.

Space junk dates back to the beginning of the Space Age. The oldest known hunk is Vanguard 1, launched by the U.S. on March 17, 1958. Forty-six years later the number of known orbital objects at least 10 centimeters wide has grown to nearly 11,000, and only several hundred of those are operational satellites, according to the U.S. Space Command in Cheyenne Mountain, Colo. Material in the lowest altitudes flies at around seven to eight kilometers a second. At that velocity, debris just a few millimeters wide would have the impact of a bowling ball moving at highway speeds.

To take action against space junk, NASA engineers in 1996 explored the idea of using a ground-based laser to deflect it out of a spacecraft's path. The laser would ablate part of the junk's surface, creating a bit of thrust to move the piece out of the way. NASA even conceptualized mounting a laser on the ISS and firing away at the debris. "But no one considered that seriously," explains Nicholas L. Johnson, head of the Orbital Debris Program Office at the Johnson Space Center in Houston. "It was projected to be a very big laser on the ground. Plus, [on the ISS it would take a lot of energy to power—more than the space station could generate." The projects were also too costly for the level of perceived risk.

That left ISS engineers to design a passive system: shielding. "The ISS literally has hundreds of shields tailor-made," Johnson says. Each consists of an outer aluminum shielding with a "stuff shield" of bulletproof Nextel or Kevlar between the aluminum and the module. At 10 centimeters thick, the shielding will stop an object up to one centimeter in diameter moving at 10 kilo-meters a second. Continued on page 4.

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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.

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 . Thanks! Klaus

“Eye on the Junk: Space Station noises renew worry about orbital debris.” Continued from page 3.

The ISS can dodge the bigger chunks. Space Command identifies objects making possible close approaches to the station within 72 hours. If some-thing is deemed a significant risk, Houston's Mission Control, in concert with its counterpart in Moscow, will alter the ISS's orbit by a couple kilometers, just enough to reduce the probability of collision. On average, mission controllers move the station once a year.

Last year Space Command added a higher-frequency radar unit to one of its ground antennas, enabling it to track objects between five and 1.0 centimeters. The single unit thus far has added 2,000 pieces to the total; Space Command's entire system is expected to be upgraded with the units within a few years. But tinier objects still pose a hazard: "Particles as small as a millimeter can do critical damage to the shuttle," Johnson notes, and they could be deadly to an astronaut on a spacewalk. As long as satellites go into orbit, it seems, junk will remain a threat.

RMAC Board Highlights

The May 2004, RMAC Board meeting did business as usual. Current membership consists of 33 members. The board was discussing about getting club insurance, cost about \$327.00 per year. It would basically cover members and in some instances cover loss & damage to scopes & equipment. The cost per member per year is \$9.91, which is reasonable and is already covered in your member dues. The June Board meeting will discuss this more and make some decision at the June Board meeting. If insurance is to be purchased, then the membership will be informed. I will keep you posted through the Newsletter.

The next Club Star Watch will be at Graneros Gorge on June 19th.

The program for June 14, 2004 is Klaus Priebe – "Astrophotography."

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

Saturn and Mars are close to each other at mags of 0.1 & 1.8. Mars will still be around all June. Saturn will not be viewable by the end of this month. The Cassini Spacecraft will give better & better views of Saturn as it approaches the planet. Jupiter shines at a mag of – 1.9, with good viewing all night. Uranus and Neptune are viewable around midnight.

The June Bootid meteor shower is between 06/26 & 07/02. This is an uncertain meteor shower, rates of 100 meteors per hour can occur. Peak may be on June 27 11pm. (Could be off by a few hours)

Comet C/2002 T7 (Linear) is visible below Jupiter. It will only be viewable for the first two weeks of June, then it goes into the horizons murk and out of view. Comet C/2001 Q4(NEAT) will be near Ursa Major in June and shines at a mag of 4.0.

Below are images Klaus Priebe has taken.

Comet C/2001 Q4 (NEAT), taken with a lx200 and a Stellarvue AT1010 Nighthawk scope.

The Lagoon Nebula, taken with a Canon 10d camera.



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 rmaceditor1@juno.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 can return your photo/slide/negative at a RMAC meeting or event or contact me & we can work something out. If you would like to see something in the newsletter or would something changed, submit your request.