The Objective View

January 2006

Newsletter of the Northern Colorado Astronomical Society

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Next Meeting: January 5, 7:30 PM
Randy Cunningham, Astrosystems

NCAS Business at 7 PM
Elections for Officers

Meeting directions Discovery Science Center
703 East Prospect Rd, Fort Collins
http://www.dcsm.org/index.html

In Fort Collins, from the intersection of College Ave and Prospect Rd, head East about 1/2 mile. See the Discovery Center sign to the South. Enter the West Wing at the NE corner. From I-25, take Exit 268, West to Lemay Ave, continue West 1/2 mile, see Discovery Center on the left.

Discovery Science Center Starwatch
703 E Prospect Road, Fort Collins
January 6 6:30 pm
March 3 6:30 pm
May 5 8:30 pm

Observatory Village Starwatch
3733 Galileo Drive, Fort Collins
Feb 19 6:30 pm
April 16

NCAS Programs, Discovery Science Center
Feb 2 Jim Bergstrom Mars Recon Orbiter HiRISE
Mar 2 NCAS Members Show and Tell

Other Events

Little Thompson Observatory Star Night, Berthoud
January 20 7 pm Dan Laszlo, NCAS
Binocular Observing http://www.starkids.org

CSU Madison Macdonald Observatory Public Nights
On East Drive, north of Pitkin Street
Tuesdays 7:30-8:30 pm if clear, when class is in session

Cheyenne Astronomical Society, Cheyenne Botanical Garden
January 19 7 pm
http://home.bresnan.net/~curranm/

Open House, Chamberlain Observatory, dusk to 10 pm
Jan 7, Feb 4, Mar 4, Apr 8, May 6 303 871 5172
http://www.du.edu/~rstencel/Chamberlin/

Longmont Astronomical Society
January 19 7 pm FRCC, 2121 Miller Rd
http://longmontastro.org/

January 5 Program
Randy Cunningham of Astrosystems will give tips on Newtonian collimation and demonstrate new products, including their barlowed laser.

December 1 Program
Endpoints of Stellar Evolution
Drs. Steve and Irene Little

It turns out that the world may end with a bang, or a whimper. With apologies to T.S. Eliot, it depends on the mass of the star involved. A 50 solar-mass star is a million times the Sun's luminosity, and consumes its hydrogen in a few hundred million years. The Sun should have a 10 billion year lifetime. Stars of 0.1 solar mass are burn much slower and have changed little since the universe began. As a star runs out of H, it shrinks and loses luminosity. He fusion begins in the core. This is followed by C, then O burning. The outer envelope of the star swells and is lost. The Sun will produce a white dwarf. In higher mass stars, heavier and heavier elements are fused. Each stage produces less energy and runs for a shorter period. The final reaction to iron in the core is completed in 5 hours. Stars of 7 to 8 solar masses can make the heavier elements but end in a terrible collapse and a supernova. A white dwarf is the size of the Earth. The surface is 100,000 K and emits lots of UV. It will take billions of years to cool. The Ring Nebula is a transformer, absorbing UV and emitting visible light, with a white dwarf central star. The first white dwarf discovered was Sirius B. The path of Sirius has a wobble induced by its companion. It has 1.08 solar mass. It was explained in the 1920s by Chandrasekhar. Most white dwarf stars have 0.6 to 0.8 solar mass. Mass loss is greater for more massive precursor stars. Binary systems can exchange mass and alter their course. Matter in the white dwarf is electron degenerate. The star is held up by exclusion of electrons. The radius is smaller for more massive WD. When the mass is greater than 1.44 times the Sun, the electrons combine with protons to form neutrons and a rigid structure forms. A star with a white dwarf companion can feed hydrogen to the WD surface. This leads to nova explosion. Some are recurrent. U Geminorum stars flare in hours or days. They may reach absolute magnitude -9. In a type 1a supernova, the mass is near 1.44 solar masses. The star is dispersed into the interstellar medium. The temperature is about 100,000,000 K. An increase of 3 or 4 degrees doubles the reaction rate. Their characteristic light curve and uniform luminosity at magnitude -20 make them a convenient standard candle for intergalactic distances. They are quite rare and are

the distributors of iron in the universe. The Chandra telescope is revealing details of X-ray remnants. A white dwarf binary can be stable. A close neutron star pair may merge in 100,000,000 years. If a star begins with greater than 8 solar masses, its core burns to iron. It ends with a type II, Ib or Ic supernova. The core rapidly shrinks at the end, collapsing in 0.1 second. The outer layers drop then rebound. Enormous numbers of electrons and protons combine to neutrons, and a burst of neutrinos escapes. This was confirmed with the 1987 LMC Supernova. Type II SN have hydrogen lines, type Ib and Ic do not. A neutron star is like a giant atomic nucleus with only neutrons. The density is 10e14 g/cc, so a sugar cube of the material weighs about 100 million tons. Thomas Gold aided detection of neutrons stars. Their event horizon is 3km times their solar masses. Initial mass must be over 3 solar masses, and most are about 1.4. They are largely detected as pulsars and X-ray emitting binaries. They have crystalline structure. Their magnetic field is 10e11 times the Sun's surface field. Rapid spin is common, some at a thousand revolutions per second. The magnetic pole often differs from the spin axis. Cones of light and radio waves are generated over the magnetic poles. Like a celestial lighthouse, this leads to pulses of radio and light emission as seen from Earth. The Crab Nebula pulsar flashes 30 times a second. The spin slowly decays as energy is lost. If mass is dumped in, the pulsar can speed up. Some binary systems evidence invisible companions with greater than 3 solar masses. There are examples of 8-10 solar masses, which must be black holes. These objects have an event horizon at 3km x their mass in solar masses. For an object at the event horizon, the escape velocity = c, and time stops. There can be no further communication with the outside. Within the event horizon is a singularity which can't be observed directly. An accretion disk outside the event horizon can emit X rays and gamma rays. Gamma ray bursts have been mysterious since they were detected by the Vela satellites as they monitored for nuclear blasts. The bursts last 1-2 seconds, or extend to 20 seconds. They are found throughout the sky, so have cosmological origin. The long GRB is a supernova collapse into a black hole. Beaming explains the intensity of the radiation, it is not emitted in all directions. The sources are seen in the arms of distant spiral galaxies. Short GRB are found everywhere and occur with merger of 2 neutron stars or a neutron star and a black hole. Within 15 years, we hope to be able to detect gravitational waves from these binaries.

NCAS Business
December 1 2005
Vice President Nate Perkins called the meeting to order. Nominations for officers for 2006 are: President, Greg Halac, Vice President, Nate Perkins. Secretary, Dan Laszlo. Treasurer, Dave Chamness. Other nominations may be presented before the January 5 2006 meeting. Discovery Science Center and Observatory Village observing nights were announced. LTO and CSU observing were noted. Lee Gregory has found the Rukl Atlas of the Moon, and the Lunar Orbiter Atlas, at Buy.com for half price.

From Andrea Schweitzer

So you thought nothing ever happens on the moon? December 23, 2005: NASA scientists have observed an explosion on the moon. The blast, equal in energy to about 70 kg of TNT, occurred near the edge of Mare Imbrium (the Sea of Rains) on Nov. 7, 2005, when a 12-centimeter-wide meteoroid slammed into the ground traveling 27 km/s.

http://science.nasa.gov/headlines/y2005/22dec_lunartaurid.htm

Kuiper Belt Gets Stranger

Space.com, 19 December 2005
http://www.space.com/scienceastronomy/051219_mystery_monday.html

By Robert Roy Britt, Senior Science Writer

A swath of space beyond Neptune is getting stranger all the time as astronomers find an ever-more diverse array of objects in various orbits
and groupings.

From Tom Teters

Daily Meteor Site
Today is the Johnson Diogenite (Mars) from 1926.
http://www.meteoritestudies.com/

Where God Might Get Ideas for Nebulae
http://sheepserver.net/v2d6/cgi/best.cgi

BEAUTIFUL!!!!

Another Website Favorite
Happy New Year all,
Here's a good site that exhibits over 185,000 space images and some of the recent astronaut's photography.
http://eol.jsc.nasa.gov/

Stardust Observations Needed Jan 15
From Jim Albers
I've been observing satellites and launches for a number of years and was recently asked to help with getting information out to the public and amateur observers about the Stardust reentry, which will occur early in the morning of Jan 15 and be visible in the Northwestern US. There were a couple of posts to Seesat a few days ago, but no direct reference to our page.

NASA and the SETI Institute are sending a DC-8 aircraft with a variety of instruments to observe the reentry in a number of wavelengths to compare heatshield performance and environment against predictions, and study how the ablative material interacts with the atmosphere to help understand how organic compounds may have been delivered to Earth.
http://reentry.arc.nasa.gov/

However, there are certain data that can only be obtained by observations from various geographic locations, such as brightness variation with changing geometry to determine temperature distribution across the heatshield, and observing the reentry with the Moon as a backlight to study development of the hot wake behind the vehicle. More details of the reentry and observations requested, including a Skymap trajectory file, are at the following page. The Moon transit info will be more complete in the next day or so.
http://reentry.arc.nasa.gov/viewingforum.html

Start an Astronomical League observing program tonight!

After finally finding some time under the stars, have you ever thought, "What should I observe? There's so much up there!"

The Astronomical League offers nearly 30 observing programs to help in just that situation. Some are designed for the novice such as Constellation Hunters, Universe Sampler, and Lunar Clubs. Other programs, including the Messier, Urban, and Planetary Observer Clubs, are better suited for intermediate observers. More experience deep sky hunters can hone their skills with the tougher selections of the Herschel, Arp Peculiar Galaxies, and Galaxy Groups and Clusters Clubs. Truly, there is a program for everyone!

Upon completion of each club, the observer is presented a certificate suitable for framing and a nifty lapel pin. These lists are a low stress way to enjoy the many wonders of the night sky.

Check out which program is right for you! Visit
www.astroleague.org/observing.html

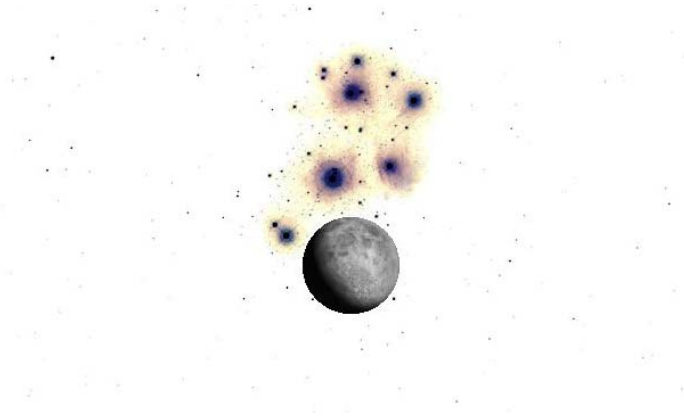
John Jardine Goss
Astronomical League, Secretary

Best Looks

Moon By Venus 1/1
by Mars 1/8; Near Saturn 1/14, 1/15
by Jupiter 1/23

Mercury	Low in SSE at dawn 1st week
Venus	SW at dusk 1st week, SE at dawn last week
Mars	Shrinks from 12" to 9", best early in month
Jupiter	In S predawn. By Alpha Librae 1/11
Saturn	High in middle of night. By Beehive cluster
Uranus	In Aquarius, low in SSE evenings 1st week
Neptune	In Cap, low in SSE evenings 1st week

Lunar Pleiades Occultation Jan 9 1900 MST



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TO: