



NEWSLETTER

RITTENHOUSE ASTRONOMICAL SOCIETY

Founded 1888 WWW.RITTENHOUSEASTRONOMICALSOCIETY.ORG

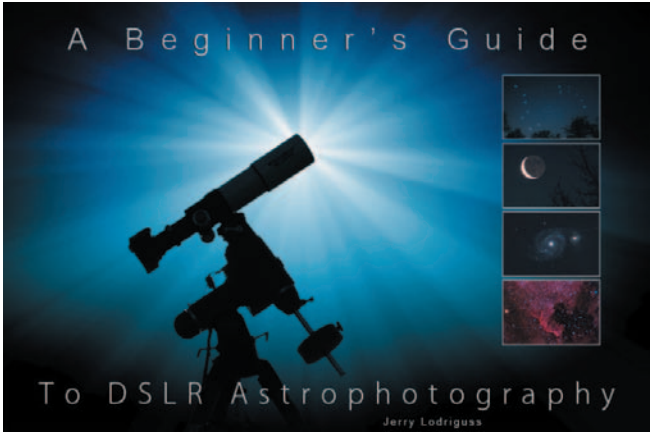
November 2009

OPEN TO PUBLIC AND STUDENTS
Upcoming Meeting on November 11th at
7:30 PM
The Franklin
20th Street and Benjamin Franklin Parkway

November's Meeting:

Jerry Lodriguss

Jerry will talk about using your DSLR camera to photograph the most amazing show in the universe - the night sky! He will explain how to get started with very simple shots on a fixed tripod, and then cover longer exposures with longer focal lengths that require tracking to compensate for the Earth's rotation. Simple and easy techniques are explained that anyone can use, including determining the correct exposure, focusing, and correcting the color balance in the camera.



October's Meeting

Member's Night

Those of you who have been reading along since last year already know I feel our member's night to be a highlight

Meeting Agenda

7:20 - Prelude
7:30 - Astronomy Lesson
President's Message
Sky This Month
Guest Speaker
Rooftop Observing - Weather Permitting

of our year. I am continually amazed at the expertise and talent those of us that are willing to share their interests, their projects, and how they help others to learn about our universe. From the outreach talks that Ruth List gave to the school for the deaf this past summer, to the talks that Dr. Kremer conducts for astronomy organizations up and down the east coast, our members represent us well through their volunteer efforts to spread the word.

Members in attendance received complimentary planispheres so that they could enact the lesson Ted Williams provided using an overhead projected planisphere. Members learned from Mike Mountjoy how they could explore the universe, digitally bit by bit, using the spare power in their home PC's or laptops. Fern shared her experience attending the Spitz Summer institute for some in depth exploration of how to teach with Starry Night in the classroom. Alan Daroff gave us an advance notice of what to look for in the evening sky. Dr. Kremer updated us with a mission report on the LRO-Cross mission that recently bombed the moon, searching for water.

I feel the highlight of the evening were the guest student presenters from NJ School For The Deaf. Alex and Ashley reported on the astronomy topics that they enjoyed this summer as a result of some outreach effort that our Treasurer and Newsletter editor Ruth List provided the students.

All in all, those in attendance walked away with a richer understanding of what our organization represents. Thanks to all those that shared with our members. Everyone is encouraged to participate in our members' night, we will be looking for some newer members to get involved next fall when we again take center stage.

~Ted Williams

Visible Planets 11/11/2009

	Rises	Transit	Sets
Mercury	08:02 am	12:59 pm	05:55 pm
Venus	06:24 am	11:47 am	05:10 pm
Mars	11:23 pm	06:33 am	01:42 pm
Jupiter	01:55 pm	07:01 pm	12:07 am
Saturn	03:38 am	09:45 am	03:52 pm

President's Message

Dr. Milton Friedman



Everyone is aware that the economy is fragile and money is scarce. At a time like this, many people only care about making ends meet, paying the rent and the supermarket bill. They see no reason for the government to spend money on the space program to study the universe and send people to the moon and Mars.

Back on January 14, 2004, President George W. Bush set NASA's mission to send people to the moon by 2020 and then onward to Mars. These goals may be realized but it takes money. President Obama has a federal budget of over 3 trillion dollars for 2010. Of this, NASA has requested \$18.686 billion. That money would be spent for different scientific endeavors: Earth science - \$1.4 billion, Planetary science - \$1.3 billion, Astrophysics - \$1.1 billion, Heliophysics (study of the sun) - \$605 million, Aeronautics - \$507 million, Space Shuttle - \$3.157 billion, International Space Station - \$2.267 billion, Education - \$126 million.

Since its inception over 50 years ago, the National Aeronautics and Space Administration has had many spinoffs beyond searching the heavens. Ultrasound and advanced imaging software enable medical professionals to rule out blocked arteries. An instrument used in CPR for people going into shock from a drop in blood pressure has been developed. Microcircuits in intensive care centers for monitoring the heart and other vital signs. Air traffic management software for commercial flights, products that clear up petroleum based pollutants of water. Temper-foam for insides of football helmets and patients with bed sores. An Anthrax smoke detector. NASA studies of Earth and its climate including the Arctic and Antarctic. These are but a few of the many useful spinoffs.

For every \$100 of the federal budget, 70 cents would go to NASA. That portion of the federal budget would not do much to save our economy and help Americans survive a depression. People have more to gain from the many spinoffs of NASA's space program that have helped everyone and made the agency's research definitely worthwhile. Who knows whether the next spinoff might be a special gift to the people here on Earth? Dollars well spent!

Ashley and Alex Shine!

Ruth M List

Rittenhouse was proud to host two students from the New Jersey School for the Deaf to be guest speakers at our members night this past month. This past summer the school held a summer school session that focused on Astronomy for a whole week. Ruth List, Rittenhouse Treasurer was a guest lecturer for the week to assist the students enriching experience to learn more about the Solar System in which we live.

Ashley Wood and Alex VanHook, Juniors from the school presented information to our group about what they learned and found interesting in the field of Astronomy. Using a PowerPoint presentation and two interpreters the students had the audience on the edge of their seats awaiting to hear what they had to say.

They talked about the two field trips that they took during the week. The first field trip was to the Ridley School District planetarium where they got to see a star field under the dome and discover where some of the planets in our solar system could be seen in the sky. The second field trip was to The Franklin Institute to see Galileo's telescope and experience many other scientific wonders. They saw the presentation of "Two Pieces of Glass" in the Fels planetarium which helped them to understand the basics of telescope optics.

Alex held up a quadrant that they students made in class to learn about how astrolabes and other similar devices are used to site objects in the sky. Ashley then talked about the Solar System mobiles that the group created and hung in their school for everyone to see.

Alex and Ashley had the audience in the palm of their busily signing hands and were a great asset to our members meeting. Great Job!!! Best of luck in your very bright and sure to be stellar futures!



The Universe's First Second - Plenty of time

Ivin Williams

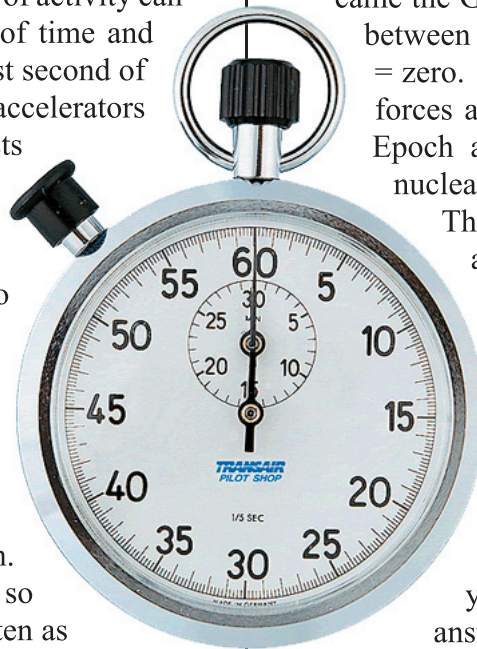
Most individuals are pressed for time and the mere thought of waiting an extra minute for someone or something is often enough to raise one's blood pressure. Conversely, people usually don't have a problem waiting one extra second if it is called for primarily because such a short duration of time is often viewed as being fairly insignificant outside of say an emergency or perhaps the outcome of a sporting event. Actually, under extreme conditions, an incomprehensible amount of activity can take place within a one second period of time and one only has to look back to the very first second of our universe's existence or to particle accelerators for proof. Theoretical astrophysicists and cosmologists have amazingly divided the universe's first second into units of not just tenths, hundredths or thousandths of a second but into billionths, trillionths and even trillionths of a trillionth of a second. Is there any sane way to remotely comprehend such miniscule units of time?

One might begin by looking at familiar examples where split seconds of time are expressed as powers of ten. The number 10 can be expressed as 10^1 so one tenth of a second could also be written as 10^{-1} . Basketball games are often decided by tenths of a second. 100 can be written as 10^2 so one hundredth of a second is 10^{-2} . Swimming events have been decided by hundredths of a second. 1000 is written as 10^3 so one thousandth of a second is 10^{-3} and this is the frame speed in cameras where human motion ceases. Continuing, one ten thousandth of a second is 10^{-4} and this is the entrance and exit time of a bullet through an apple that has been fired from a very high powered rifle. One hundred thousandth of a second is 10^{-5} and this is the frame speed in certain motion picture cameras used by the scientific community. One millionth of a second is 10^{-6} and we are only half way to reaching one trillionth of a second, which is expressed as 10^{-12} . It is easy to see how one could find themselves sucked into a black hole of an infinitesimal small amount of time using negative powers of 10.

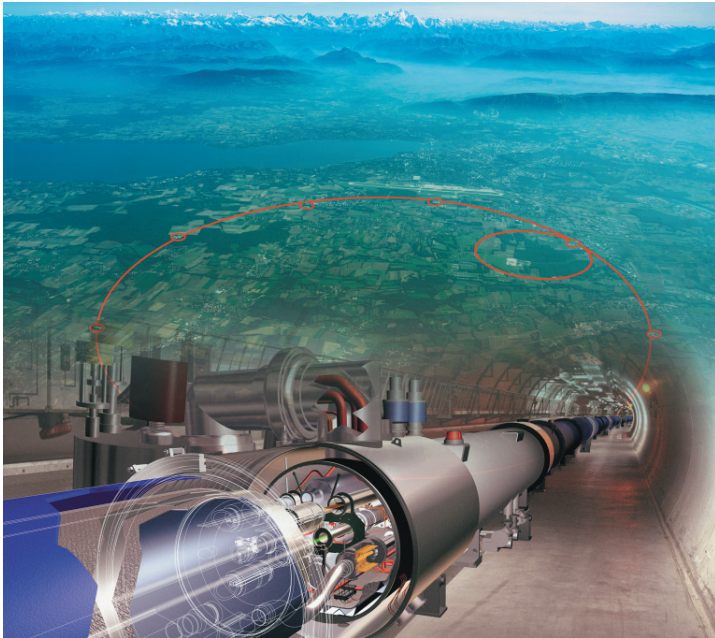
Our universe according to the Big Bang Theory began at time = zero and was immediately followed by an unimaginably short duration of time called the Planck Epoch.

This Planck Epoch named after the German physicist Max Planck occurred at 10^{-43} seconds after time = zero and is believed to have been the only time in the history of our universe where all of the four fundamental forces (gravity, strong nuclear, electromagnetic and weak nuclear) were united as one super force prior to splitting away from each other one by one. Astrophysicists currently have no model as to what the universe might have looked like prior to this Planck Epoch but the physics at that time surely would have been vastly different than what we currently know them to be due to this unification of forces. After the Planck Epoch came the Grand Unification Epoch which took place between 10^{-43} seconds and 10^{-36} seconds after time = zero. Gravity split away from the other unified forces at the beginning of the Grand Unification Epoch and at around 10^{-36} seconds, the strong nuclear force also separated itself from the pack.

This particular event significantly upset the apple cart so to speak and resulted in an Inflationary Epoch between 10^{-36} seconds to about 10^{-32} seconds where the universe increased in size exponentially. Space but not matter (particles) is believed to have expanded at a rate faster than the speed of light during this period of rapid inflation and the inclusion of it into the Big Bang model some years back has been extremely helpful in answering many questions that have long puzzled astrophysicists regarding the universe that is observed today. Inflation ended at about 10^{-33} or 10^{-32} seconds after time = zero. Here the expanding universe settled back to some normalcy and at 10^{-12} seconds, the electroweak force separated into the electromagnetic and weak forces resulting in the final symmetry break of the four fundamental forces. At about 10^{-6} seconds to 1 second after time = zero, free quarks which are elementary particles of matter combined to form subatomic particles namely protons and neutrons and the matter that is currently observed throughout the universe began to emerge. All of this activity took place of course under the most extreme of conditions but astrophysicists don't have to lose any sleep wishing for the return of the Big Bang to get a glimpse of what might have actually taken place within that first second because particle accelerator experiments are suppose to soon be conducted at conditions and energies that will approach those that existed at the time of the Big Bang.



The Large Hadron Collider (LHC) is located several hundred feet beneath the border of France and Switzerland and it is by far the largest, most energetic and not to mention, the most expensive particle accelerator ever built. It was suppose to be colliding particles by now in order to observe the existence or nonexistence of various subatomic particles and to also test various other theories related to the Big Bang but due to some setbacks that began shortly after it first came online last year, it has yet to collide any particles. The overall size and complexity of the LHC surely has a lot to do with it not currently being up and running but it is now scheduled to be turned back on later this month but only at half of it's energy capacity. Still, this should be enough for the LHC to give astrophysicists the best view yet at what may have actually taken place during the universe's very first second.

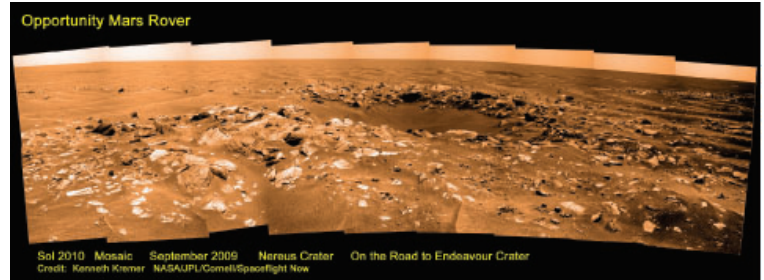


The exact times that each of the aforementioned epochs or events that theoretically took place within the universe's first second are subject to change as more information is gathered by the LHC and other future particle accelerators. The important thing to remember though is that even though us humans are not fortunate enough to possess the physical ability to actually comprehend units of time that are billions and even trillions of times shorter in duration than the blink of an eye, an incomprehensible amount of activity did take place within the universe's very first second of existence and may even currently be taking place somewhere out there beyond our known universe.

Nereus Crater on Mars

Astronomy Picture of the Day: 19-Oct-09

Dr. Ken Kremer



My newest Mars mosaic creation was published at "Astronomy Picture of The Day" website (APOD) on 19 October 2009 and titled "Nereus Crater on Mars".

*APOD Website: <http://apod.nasa.gov/apod/ap091019.html>
Credit: Kenneth Kremer NASA/JPL/Cornell/Spaceflight Now*

The panoramic mosaic shows the scene of the Opportunity rover recently driving past "Nereus Crater" on Sol 2010 as she carefully navigates the treacherous sand dunes of Meridiani Planum on the road to her next target, the giant 14 mile wide crater named "Endeavour". "Nereus" is a 30 ft wide young impact crater and roughly 5 ft deep. NASA JPL Mars scientist Dr. Matt Golembek informed me, "The rocks forming the ejecta are standard sulfate sedimentary rocks that Opportunity has been investigating during her traverse."

Everyone attending the Rittenhouse Astronomical Society monthly meeting on October 14, 2009 got a sneak peak at the mosaic. RAS webmaster Ted Williams has kindly featured it on the RAS Home page

The mosaic originally published at the Spaceflight Now and Universe Today websites a few days prior to APOD.

Spaceflight Now:

<http://www.spaceflightnow.com/news/n0910/11meteorite/>
http://www.spaceflightnow.com/news/n0910/11meteorite/opportunity_full.jpg

Universe Today:

<http://www.universetoday.com/2009/10/18/opportunity-discovers-still-another-meteorite-findit-on-google-mar/>

NASA's LRO and LCROSS Post Impact Update

Dr. Ken Kremer

At the October 14 RAS Monthly meeting I presented a brief status report on NASA's newest lunar missions, the Lunar Reconnaissance Orbiter (LRO) and the Lunar Crater Observation and Sensing Satellite (LCROSS). LCROSS successfully smashed into the lunar south pole on 9 October 2009 in search of frozen water ice inside the permanently shadowed Cabeus A crater target. Science results will be announced by mid December 2009

Check out the Universe Today website to see my LCROSS & LRO photos from inside the "Clean Room" featured online on October 8, 2009, the day before the October 9 impact:

"LCROSS (and the Moon) Up Close"

<http://www.universetoday.com/2009/10/08/lcross-and-the-moon-up-close/>

Read my LRO & LCROSS article featured in the November 2009 issue of Spaceflight Magazine here titled, "LRO and LCROSS put US on lunar trajectory"

<http://www.bis-spaceflight.com/sitesia.aspx/page/183/id/2088/1/en-gb,en-gb,en-us>



Rittenhouse Astronomical Society: The Oct 14 Monthly club meeting was member's night and Dr Ken Kremer presented "LRO & LCROSS Post Impact Update: America Returns to the Moon" and reported on his up close tour of the two spacecraft and the latest mission results.

Our **NEW** Mailing Address:

Rittenhouse Astronomical Society
P.O. box 283
Feasterville, PA 19053-0283



NJ Gifted Children Conference at Mercer County Community College, NJ: School children were thrilled to learn about the Mars Rovers in 3-D from Ken at a conference for gifted children and their parents in New Jersey on Oct 24

Astronomy Outreach:

Dr. Ken Kremer

October 2009 was a busy month for outreach as I presented 6 lectures in NJ and PA about STS-125/Hubble, LRO & LCROSS and Mars Mission updates at Astronomy Clubs, Star Parties and for school children.

Please contact me for more info or science outreach presentations by email. My upcoming Astronomy talks include:

Gloucester County College Astronomy Club: Sewell, NJ, Nov, TBD, 7 PM. "Fixing Hubble: Eyewitness to Shuttle Atlantis Launch to save The People's Telescope"

Website: http://www.gccnj.edu/news_and_alerts/rotating_ads/ken_kremer.cfm

Riverside Elementary School, Family Astronomy Night: Princeton, NJ, Dec 9, 6 PM. "Phoenix and the Twin Mars Rovers (in 3-D)"

Café Scientifique: Philadelphia, PA, April 6, 6 PM, Belle Cena Restaurant. "6 Years of Mars Rovers and the Search for Life (in 3-D)" **Website:** <http://www.sciencecafephiladelphia.org/Home.html>

Please contact me by email for more info or presentations.
Dr. Ken Kremer Email: kremerken@yahoo.com
NASA JPL Solar System Ambassador & The Planetary Society **Website:** <http://www.rittenhouseastronomicalociety.org/Dr.Kremer/K.htm>