The Spectrogram

Newsletter for the Society of Telescopy, Astronomy, and Radio

January 2015

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S*T*A*R
P.O. Box 863
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On the web at:
http://www.starastronomy.org

January Meeting

The next meeting of S*T*A*R will be held Friday, January 9 from 7 pm to 10:30pm at the home of president Kevin Gallagher. The meeting will be our annual Winter Social event. Kevin and Donna Gallagher will provide refreshments, and ask that members make a contribution to the club in the amount they would have spent to purchase items for our usual potluck winter social.

Calendar

January 9, 2015 – S*T*A*R meeting

February 5, 2015 – S*T*A*R meeting

February 25, 2015 - Mill Lake Star Party

December Meeting Minutes

By Steve Fedor

The Dec. 4th, 2014 meeting of S*T*A*R Astronomy club began at 8:04 p.m. The meeting was attended by 18 people. Vice President Rob Nunn chaired the meeting.

The evening's talk was presented by STAR member Ken Legal. Ken presented a great talk that described the Hertzsprung-Russell Diagram, the famous chart that graphs the apparent magnitude and age of stars vs. their light spectrum and temperature. The talk was thoroughly enjoyed by all. Ken then continued with observing opportunities for the upcoming month. The talk ended at 8:52 for coffee break.

Observing Highlights:
Venus appearing in the evening sky starting in late Dec. Will be visible at dusk until July. Highest in late May/early June, will set then around 11:45pm EDT
Mercury visible in evening sky from about Jan 8th to the 20th...it'll be close to Venus from the 8th to the 12th (within a degree!).
Mars/Neptune conjunction on Jan 19 (0.2 degrees apart).
Venus/Neptune conjunction on Feb 1.
Venus/Mars conjunction on Feb 21 (0.2 degrees apart).
Venus/Uranus conjunction on March 4 (0.3 degrees apart).
Mars/Uranus conjunction on March 11.

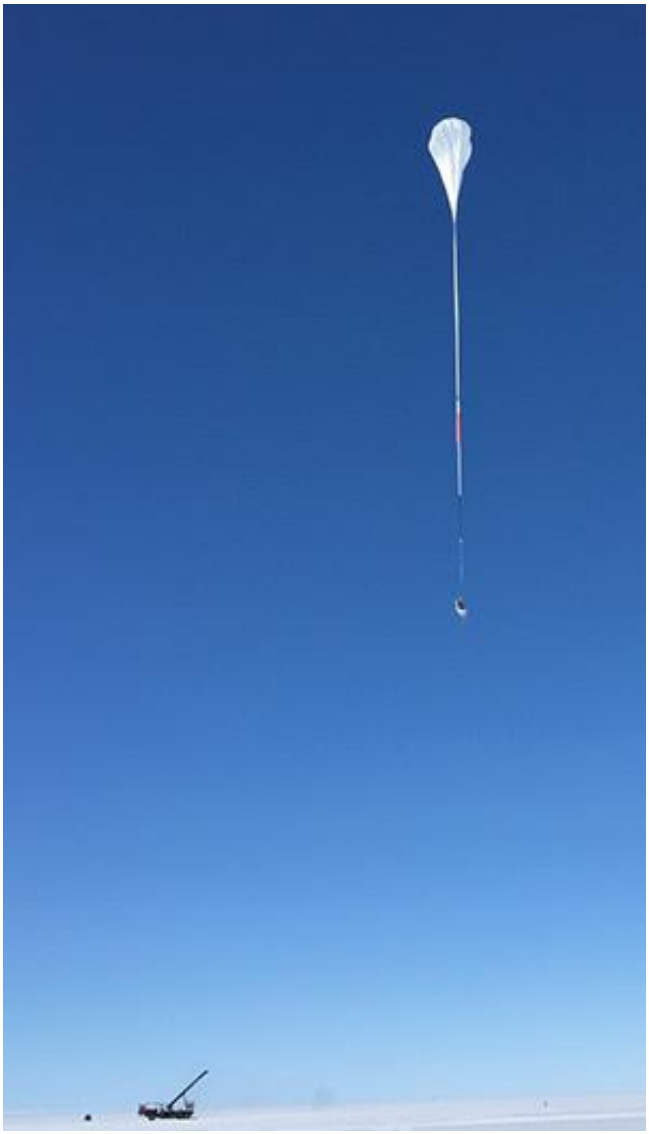
After the break the meeting resumed with Rob announcing that there may be a change of plans for the Winter Social meeting scheduled for Friday Jan. 9th due to Kevin experiencing health issues. [Note: Since then it has been confirmed that the social will be held at Kevin's house on the 9th as planned.]

Upcoming observing events were then discussed:
3/31/15 Mill Lake School, Monroe
Hueber Woods possible April/ May

Russ reported that the Pine Brook star party was successful. Rob announced he will schedule Doorbrook for 12/26 and/ or 1/16.
Rob also announced there is no news on the club's 25 inch obsession

The meeting was adjourned at 9:37.

Princeton satellite heads to the 'edge of space' to study the early universe



SPIDER, a stratospheric spacecraft constructed primarily in Princeton's Jadwin Hall, was successfully launched Jan. 1 from Antarctica's Ross Ice Shelf. Borne by a helium-filled balloon, SPIDER will orbit Earth at roughly 120,000 feet for 20 days. During that period, SPIDER's six large cameras will look for the pattern of gravitational waves produced by the fluctuation of energy and density that resulted from the Big Bang. Credit: Zigmund Kermish, Department of Physics

(Phys.org) —With a noise like giant flags billowing in the wind, the massive white helium balloon rose into the air and carried SPIDER, a telescope designed to investigate the origin of the universe, high above Antarctica. The successful Jan. 1 launch signaled the

beginning of a roughly 20-day mission above the continent.

"At this early stage things are looking as good as we could hope," said William Jones, an assistant professor of physics at Princeton University, in an email from Antarctica. Jones is the leader of the multi-institution effort to launch the balloon-borne telescope. Updates from the SPIDER team are posted to Princeton's SPIDER blog, and the instrument can be tracked on the Columbia Scientific Balloon Facility's website. A September story and video detailing the SPIDER mission are available on Princeton's website.

Pushed by circumpolar winds, the balloon will carry SPIDER at an altitude of roughly 120,000 feet while the instrument's six cameras search for faint remnants of gravitational waves left over from the Big Bang during a rapid-expansion process known as inflation. According to Jones, SPIDER is "an experiment that can extend the horizons of our knowledge to, quite literally, the beginning of time."

The launch, at a facility about 10 miles from McMurdo Station, came after a day of uncertainty over whether the attempt would be scrubbed due to excessive wind, said Zigmund Kermish, an associate research scholar at Princeton.

"Everyone wants the textbook smooth launch, but it's a real challenge to line up the launch vehicle just right with the balloon, payload and flight line in the limited time available," Kermish said. "When the pin was released and our payload [SPIDER] snapped forward and started ascending, I simultaneously felt relief, fear and immense pride in the team for what we'd accomplished."

Jones credited his team with the success of the launch, especially the graduate students and postdoctoral researchers. "These young people work so hard, for so long," Jones said. "Then, in a matter of less than a minute, this product of their hopes and dreams, sweat and blood, is violently flung off the end of the launch vehicle and begins its ascent to the edge of space."

The collaboration behind SPIDER—formerly an acronym but now the project's formal name—includes the University of Toronto; Case Western Reserve University; the California Institute of Technology and the Jet Propulsion Laboratory, a NASA-funded research center managed by Caltech; and the University of British Columbia.

Now that the craft is airborne, every minute of the flight is precious, Jones said. "We have three shifts staffing an operations room in Antarctica 24/7, watching for system faults, fixing them when necessary and generally enforcing strict discipline on the duty cycle of science observations," he said.

Jon Gudmundsson, a Princeton postdoctoral research associate, said the team won't relax until the flight is over and the data are safely collected. Once SPIDER floats back to Earth in early January, the researchers have about a week to locate it and retrieve the recorded data. Recovering SPIDER depends on where it lands, which could be near the launch site, or somewhere on the ice shelf that requires a trek on skis or by tractor to haul the instrument back. The researchers must be gone by mid-February before the onset of the severe Antarctic winter in March.

"Tired and teary-eyed, we would like to celebrate the successful launch, but we also realize that the fruit of our labor is defined by the flight as a whole, not just the launch," Gudmundsson said. "We are therefore forced to remain focused until the very end of our flight."

The Magellanic Clouds may be much larger than astronomers calculated

SMASH DECam image in the Small Magellanic Cloud with moon for scale.

(Phys.org)—The Magellanic Clouds are the two brightest nearby satellite galaxies to our own Milky Way galaxy. From a new study it appears that not only are they much bigger than astronomers calculated, but also have non-uniform structure at their outer edge, hinting at a rich and complex field of debris left over from their formation and interaction. This is an early result from a survey called SMASH, for "Survey of the MAgellanic Stellar History", carried out by an international team of astronomers using telescopes that include the Blanco 4-meter at Cerro Tololo Inter-American Observatory (CTIO) in Chile and presented today at the 225th meeting of the American Astronomical Society in Seattle, Washington.

The Large and Small Magellanic Clouds are dominant features in the Southern hemisphere sky. Although named after explorer Ferdinand Magellan who brought them to the attention of Europeans, they were already known to every early culture in the Southern hemisphere. The Large Cloud (LMC), covering about 5 degrees in angular size (10 lunar diameters), appears to the naked eye like a detached piece of the Milky Way. At a distance from us of about 160 thousand light years, even the brightest stars in these galaxies can't be seen without a telescope.

As principal investigator Dr. David Nidever (University of Michigan) says, "We have a decent understanding of how large galaxies like the Milky Way form, but most galaxies in the universe are faint, distant, dwarf galaxies. The Magellanic Clouds are two of the few nearby dwarf galaxies, and SMASH is able to map out and study the structures in them like no other survey has been able to do before."

"We knew from the earlier work of SMASH team members that the LMC was larger than we thought, but those observations probed only 1 percent of the area that we need to explore. SMASH is probing an area 20 times larger, and is confirming beyond doubt that the LMC is really large while also giving us a chance to map its structure in detail." said Dr. Knut Olsen (National Optical Astronomy Observatory) one of the leaders of the SMASH team. The team has identified stars belonging to the LMC at angular distances up to 20 degrees away, corresponding to 55 thousand light years. This was done using a new camera, dubbed DECam, mounted on the CTIO Blanco 4-meter telescope, which allows the SMASH team to identify faint stars over a much larger area than ever before.

With the Blanco telescope, SMASH can detect exceptionally diffuse stellar structures – up to 400,000 times fainter than the appearance of the faint band of the Milky Way in the night sky. This is possible because DECam can distinguish individual faint Magellanic stars over a huge area. (In astronomical parlance, the survey can reach a surface brightness limit of ~35 magnitudes per square arc second). That allows the team to detect stellar structures that were previously much too faint to see.

The team is also exploring the Magellanic Stream, a gaseous structure that connects the two Clouds and extends in front and behind them. The existence of the Magellanic Stream, first detected with radio telescopes over 30 years ago, clearly indicates that the two galaxies are interacting with each other and with our Milky Way. Astronomers have long expected to also find stars in the Stream but so far none have been detected. It's likely this is because the stellar component of the Stream is too faint to have been detected until the availability of the new camera. As Dr. Nidever said, "SMASH's ability to reveal super-faint

stellar structures should not only allow us to finally detect the stellar component of the Magellanic Stream but also map out its structure which will give us a much better understanding of the Magellanic Clouds' interaction history."

Are you a S*T*A*R Member?

S*T*A*R meets the first Thursday of each month, except July and August, at 8:00 p.m. at Monmouth Museum on the campus of Brookdale Community College in Lincroft, NJ. Meetings usually include a presentation of about one hour by a guest speaker, a break for refreshments and socializing, a description of interesting objects to view, and a discussion of club business.

Memberships:
( )Individual...$35
( ) Family...$45
( ) Student…$15

Name_____

Address_____

City_____State___Zip_____

Phone_____

Email_____
Make checks payable to: STAR Astronomy Society, Inc. and mail to P.O. Box 863, Red Bank, NJ 07701

The club owns 8" f/8, and 13" f/4.5 Dobsonian telescopes which are available for use by members. To borrow a telescope, please contact the Vice President.

The officers of S*T*A*R are:
President Kevin Gallagher
Vice President Rob Nunn
Secretary Michelle Paci
Treasurer Arturo Cisneros
Member at Large Dave Britz

S*T*A*R members can join the Astronomical League (AL) for a small fee. Members receive the AL publication Reflector.

In the Eyepiece

Here is a list of objects for this month. This is reproduced from www.skyhound.com with the kind permission of its creator and author of SkyTools Greg Crinklaw.

Object(s)	Class	Con	RA	Dec	Mag
M35 & NGC 2158	Open Cluster	Gemini	06h08m51.9s	+24°20'28"	5.6
M38	Open Cluster	Auriga	05h28m39.4s	+35°50'24"	6.8
Sigma Ori	Multiple Star	Orion	05h38m44.8s	-02°36'00"	3.8
M37	Open Cluster	Auriga	05h52m22.3s	+32°32'40"	6.2
The Trapezium	Multiple Star	Orion	05h35m16.5s	-05°23'23"	5.1
NGC 2017/HR 1944	Multiple Star	Lepus	05h39m16.2s	-17°50'58"	6.4
Beta Mon	Multiple Star	Monoceros	06h28m49.1s	-07°01'59"	3.8
NGC 2112	Open Cluster	Orion	05h53m52.2s	+00°23'32"	9.1
IC 418	Planetary Nebula	Lepus	05h27m28.2s	-12°41'50"	10.7
NGC 1931	Open Cluster	Auriga	05h31m24.8s	+34°15'12"	10.1
IC 2149	Planetary Nebula	Auriga	05h56m23.9s	+46°06'17"	11.2
NGC 1893 & IC 410	Open Cluster in Nebula	Auriga	05h22m41.1s	+33°23'49"	7.8
M50	Open Cluster	Monoceros	07h03m12.3s	-08°19'28"	7.2
The Crab Nebula	Diffuse Nebula	Taurus	05h34m30.0s	+22°01'00"	8.4
NGC 2022	Planetary Nebula	Orion	05h42m06.2s	+09°05'10"	12.4
Hubble's Variable Nebula	Reflection Nebula	Monoceros	06h39m12.0s	+08°44'00"	--
H 3-75	Planetary Nebula	Orion	05h40m44.8s	+12°21'16"	13.9
IC 421	Galaxy	Orion	05h32m14.8s	-07°55'01"	12.3
NGC 1999	Diffuse/Dark Nebula	Orion	05h36m24.0s	-06°43'00"	--
The Horsehead	Diffuse/Dark Nebula	Orion	05h41m00.0s	-02°27'00"	--
Abell 12	Planetary Nebula	Orion	06h02m21.4s	+09°39'07"	13.9
IC 443	Diffuse Nebula	Gemini	06h17m48.0s	+22°49'00"	12.0
The Cone Nebula	Open Cluster	Monoceros	06h41m03.2s	+09°53'07"	4.1
NGC 2242	Planetary Nebula	Auriga	06h34m07.4s	+44°46'37"	15.2
K 2-2	Planetary Nebula	Monoceros	06h52m28.4s	+09°58'17"	12.5

Coordinates are epoch 2000.0