



# THE APPULSE

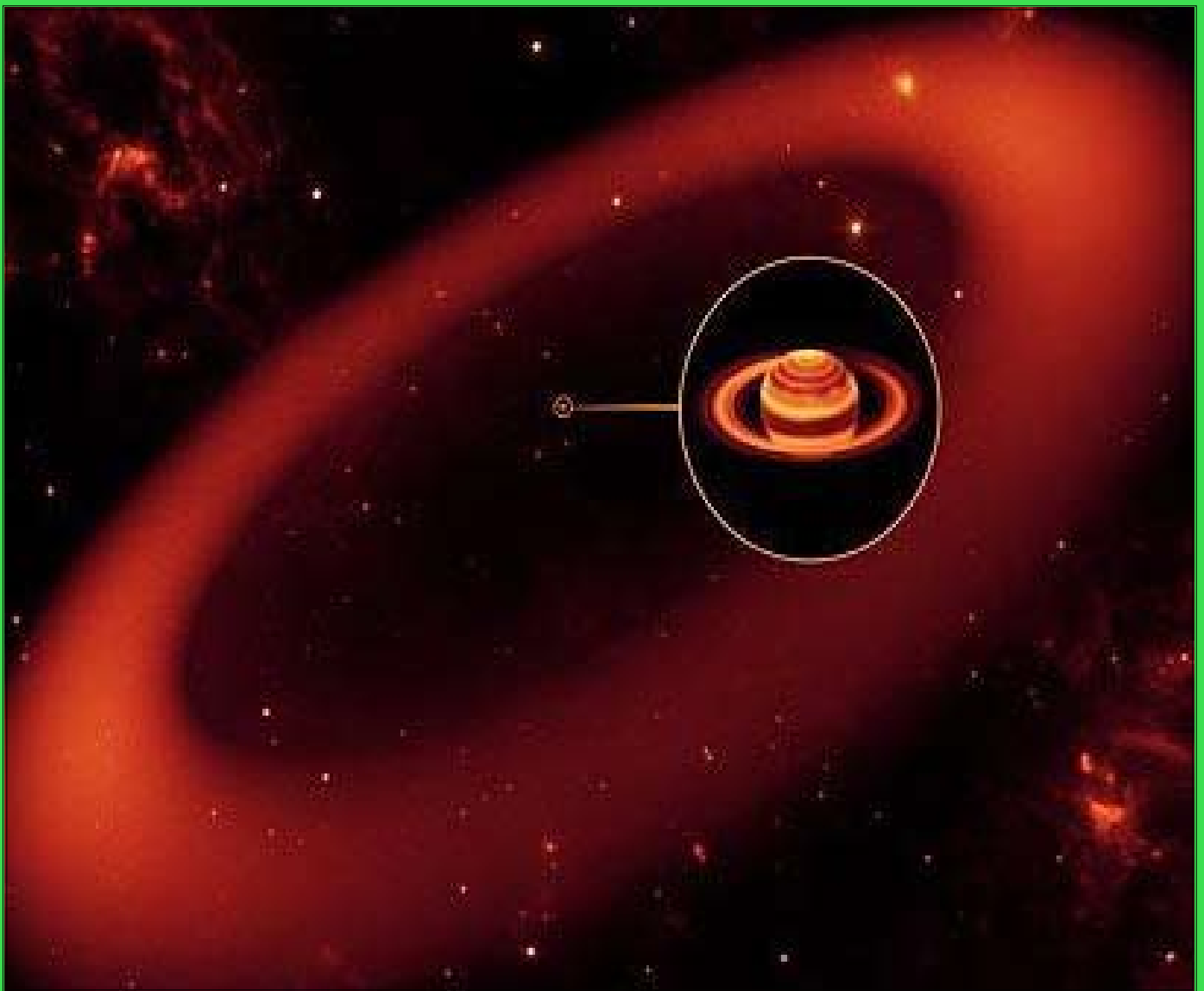
Official Newsletter of the Philippine Astronomical Society

PROPELLING ASTRONOMY EDUCATION TOWARD THE ACHIEVEMENT OF SCIENTIFIC EXCELLENCE AMONG FILIPINOS

Vol. 41 No. 66

October 2009

An eighth ring has been discovered around Saturn by a NASA telescope that was able to pick up the thin array of ice dust particles



An artist's rendering released by NASA shows the biggest but never-before-seen ring around Saturn, spotted by NASA's Spitzer Space Telescope  
Photo: AP

Story on page 3

# SEPTEMBER 2009 MONTHLY MEETING REPORT

by Milo Dacanay

More than sixty members, teachers, and students representing University of the Philippines (UP)- Diliman and Manila, Ateneo de Manila University (ADMU), Rizal Technological University (RTU), Philippine Normal University (PNU), Manila Cathedral School, Quezon City Science High School, St. Paul University of Manila, La Salle Araneta University, and guests attended the PAS monthly meeting last September 19, 2009 at the Manila Observatory, Loyola Heights, Quezon City.

The meeting promptly started at 3:00 PM. Early birds were the BS Astronomy students Batches 1 and 2 of RTU together with student members from UP and ADMU. Two lectures were prepared and presented for the day: Stellar Evolution by Nikita Bacalzo of ADMU and Quasar and Active Galaxies by Ma. Lourdes Lequiron

of RTU. Numerous questions were asked, some of which were the following:

What happened when two black holes collide? by Edward Von, La Salle Araneta University.

Are the stars rotating on its axis? by Nilo Largo, PNU Astrosoc

How did this rotation arise? by Nilo Largo-PNU Astrosoc

What was formed first, star or galaxy?

As quasars travel more than the speed of light and assuming one is able to travel along, what will he see from behind and in front?

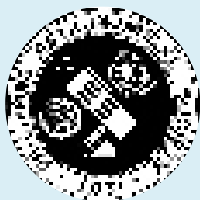
After the break for snacks, two more lectures were presented on request by the participants. This time, Leo Manosca (a graduating student from UP and incumbent PAS Board of Director) presented basic astronomy education on Celestial Navigation followed by the tireless former PAS President and Board of Director Edmund Rosales who talked on JAXA Geophysical Navigation.

Engr. CG Dacanay also asked the members to support the 2010 Asteroid Occultation joint project of NASA-PAS headed by Ronald Tanco.

Despite the intermittent rain showers and cloudiness, all participants proceeded to the roof deck after the lecture series for practical astronomy session led by Ronald Tanco and Edmund Rosales.

Members and participants were celestially entertained by the presence of the most cooperative of all planets - Jupiter! The participants were noticeably amazed not only by what they saw but more than anything else, by the total amount of knowledge they scooped from such a short monthly meeting.

The meeting/practical astronomy session adjourned officially at 10:00 PM.



## THE APPULSE

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## TELESCOPES FOR SALE



6-inch f/5 Newtonian on EQ3-2 mount with dual-axis motors, includes 2 eyepieces 10mm and 25mm, 6x30 finder scope, accessory tray, tripod, tube rings.  
**SRP P40,000.**



8-inch f/6 Newtonian on collapsible Dobsonian mount, includes 2 eyepieces 10mm and 25mm, 8x50 finder scope, eyepiece rack, tension control, and tube caps.  
**SRP P40,000.**

Contact: Allen Yu at 241-2938/0916-539-6858 for price and further info.

## PASERS' NOTES (Recent to Past)

**From Susan Albaracin, Canada**

*A phenomenon! did I spell that right... whatever...I have seen the Northern Lights and it is definitely amazing....how those particles from outer space enter the Northern poles and create these beautiful lights... it's real something to see. Have not seen it this year though, strange weather and this erratic change of warm and cold weather. I just wish I knew how to work this scope of mine...oh! well as soon as I do will let you know...hahaha...*

*Babe the skies here is amazing, what a wonder talaga. And the colors are changing fast. All hues of yellow, orange, brown, burgundy, purple, blue, red etc.... I guess Autumn is fast approaching so will just have to enjoy every moment. Oh! John invited us to his observatory in Baguio so hopefully one day we could go....got to check out the one in UP too. Basta one day when I get home will organize a meet up. Have a great day!*

Susan

**From John Nassr, Baguio City**

*Akala ko I was the only one staying up late*

*(imaging) to make contributions to the Appulse. Kayo rin pala often have to burn the midnight oil to get PAS's venerable publication to us on time. By the way, I know of no other longer lasting and older continuing astronomical publication in the Philippines than the Appulse. Thanks to the sustaining efforts of people like you.*

*Saludo ako sa inyo!*

John

*Thank you so much for finding time in your busy schedule and sending me this month's Appulse special on the solar eclipse! The event will surely be long remembered by the many who took time to marvel at the rare event. I also thank and commend the energetic and tireless Appulse team without whom this most interesting publication would not be possible.*

*By the way, the skies might just be clear enough in the next few nights to do observing again!*

*Best regards and wishes to all,*

John

**From Richard Taylor, Canada**

*Greetings from sunny Ottawa, although the weather forecast for the rest of the week is rainy. The tulips are out, but the squirrels are eating the flowers and scattering the petals on our garden path.*

*... I did do a slide/oral presentation of my "Take Time to Observe" at last Friday's RASC meeting. It was well received and I got a few comments afterwards about other people who enjoyed making up their own constellations.*

*On Sunday, my high school welcomed back a former student: Dr. Steve MacLean, a former astronaut and now the president of the Canadian Space Agency. He gave a fascinating talk about his experiences in orbit.*

*...We were missing the Philippines just this morning as we looked over some pictures of Filipinos dancing in brightly colored costumes. Not sure which festival it was.*

Richard

An eighth ring... *from page 1*

**P**reviously it was thought that the famous planet only had seven rings named A through to E and several faint unnamed rings.

However, Nasa's Spitzer Space Telescope was able to discover a new ring by picking up tiny particles of dust and ice using an infrared instrument.

The ring is about 1.5 million miles thick and fifty times further out into space than Saturn's other famous rings, making it bigger than any other ring previously studied in the Solar system. Until now the biggest known rings in the solar system were Saturn's E ring.

NASA's Jet Propulsion Laboratory, that announced the discovery, said the ring was probably made up of debris kicked off by Saturn's moon Phoebe by small impacts.

The telescope was able to pick up tiny particles of ring dust, that shine with thermal radiation from the Sun, by using an infrared instrument.

A paper on the discovery has been published by the journal Nature.

Anne Verbiscer, at the University of Virginia in Charlottesville and one of the authors of the paper, said the ring could tell scientists more about Saturn and other planets.

"This is a unique planetary ring system because it's the largest planetary ring in the solar system," she said.

"The particles are very, very tiny, so the ring is very, very tenuous – and actually if you were standing in the ring itself, you wouldn't even know it. In a cubic kilometre of space there are all of 10 to 20 particles." In particular the ring may answer the riddle of another moon around Saturn, Iapetus, which has a bright side and a very dark side. Scientists think that the debris from Phoebe is not only creating the ring but impacting

with Iapetus, which is going the opposite way, creating a thick layer of dust on one side of the planet over billions of years.

The Spitzer mission, launched in 2003, is managed by Jet Propulsion Laboratory in Pasadena. Spitzer is 66 million miles from Earth in orbit around the sun.

*Article by Space.com  
Published: 1:42PM BST 07 Oct 2009*

**Enormous New Ring Found Distantly Orbiting Saturn**

by Andrea Thompson

*Senior Writer, Space.com  
posted: 07 October 2009*

There's a new king of rings in the solar system: An enormous new ring has been discovered around Saturn, made up of debris from the gas giant's distant moon Phoebe.

*Continued on page 5*

# TIME TO ENJOY THE OCTOBER TO DECEMBER METEOR SHOWERS!!

by Victoria Evarretta

October to December 2009 appear to give us perfect watching conditions for a meteor shower as there would be no brightly glowing moon interference this year. Brace for the following dates and set aside your time from night to dawn to watch these supposedly spectacular displays of heavenly fireworks in the sky.

## ORIONIDS - Oct. 2-Nov. 7 - peaks October 21

There should be no interference from the waxing crescent moon. From a dark site, maximum rates may reach 20-25 yellow and green meteors per hour with some lulls. The Orionids are fast meteors known to produce fireballs. As its name implies, the Orionids radiates from the Orion Constellation (its radiant), which start to rise at the eastern horizon at 11 PM in October at should be at the zenith at 1 AM.

## LEONIDS - Nov. 14-21 - peaks Nov. 17

The predicted outburst is 100-500 Leonids per hour! Definitely schedule your night



Photo credit: Palomar.edu

time to watch this meteor shower! Hopefully, no typhoons hit us during the peak date. The moon will be completely out of the picture and will thus not be a viewing impediment. Leonids are fast meteors but can produce impressive earthgrazers as its radiant Leo rises in the eastern horizon at

about 1AM and will be close to the zenith at 5 AM. The best observing time thus is possibly from midnight for earthgrazers to pre-dawn hours at 5 AM for the best and peak rates. Before midnight, Leonid activity may be nonexistent. The Leonids are best known for their 33-year peaks, during which 100s of meteors per hour can be observed. The last of these peaks occurred in 2001 as observed in torrents at China.

## GEMINIDS - Dec. 7-17 - peaks Dec. 13

The Geminids have a fairly broad maximum, so viewing should be productive throughout the entire night of December 13/14 (late Sunday evening into Monday morning). New Moon this year allows observation during the entire night.

The radiant Gemini peaks in the eastern horizon at around 8 AM and is highest in the sky at around 1 AM.

I remember seeing the brightest and flashiest earthgrazer in 2007 at 7:30 PM from our viewing site at the Manila Observatory roof deck; and at 5 AM, meteors were still raining in the sky.

Considered the most reliable meteor shower of the year, the Geminids are characterized by their multicolored display of white (predominant), yellow, blue, red, and green meteors. They are medium-speed meteors. Most

of them don't leave glowing trains, but they can produce observed rates of more than 100/hour at maximum.

Let me mention that the Geminid shower observation was totally dismal in 2008 with the then bright moon gliding the sky and



Photo credit: Space.com

the clouds covering the view; but it was a most spectacular, delightful display in 2007 when the Geminids kept us observers at the Manila Observatory shrieking every second with joy!

Comets shed the debris that becomes most meteor showers. As comets orbit the Sun, they shed an icy, dusty debris stream along the comet's orbit. If Earth travels through this stream, we will see a meteor shower.

Meteor showers are named by the constellation from which meteors appear to fall, a spot in the astronomers call the radiant. For instance, the radiant for the Leonid meteor shower is located in the constellation Leo.

No need for binoculars to watch a meteor shower. Find a dark, secluded spot away from city lights and oncoming cars. Once you are settled at your observing spot, lay back or position yourself so the horizon appears at the edge of your peripheral vision but with the sky/stars filling your field of view. Pack some mats or plastic sheets where you can lie on and bring some snacks. As it may be chilly during the night, bring warm clothing as well. It's definitely enjoyable to watch the meteor showers with your family and friends. Happy meteor observing everyone!

Sources: *Starry Night* by Bernie Esporlas, *StarDate*, *SkyScrapers*, Wes Stone's *Major Showers in 2009*.



Before the discovery of this massive ring — about 12.5 times the average distance between the Earth and the moon in width and 6 times that distance in thickness — the largest known planetary rings were Jupiter’s gossamer rings and Saturn’s E ring.

Astronomers have long suspected the presence of this ring, which orbits Saturn at a radius of about 8 million miles (13 million km) — 200 times the radius of the planet itself.

“There were hints that it could be there,” said Douglas Hamilton of the University of Maryland, one of the astronomers who found the ring.

One such hint was the unusual coloring of Saturn’s moon Iapetus, which had one dark side and one light side. Some astronomers suspected that the dark side, which looked suspiciously similar in composition to another of Saturn’s satellite, Phoebe, was actually debris dust from Phoebe stuck to Iapetus’ surface.

But astronomers haven’t been able to detect it until now because, “this thing is just immense,” Hamilton told SPACE.com. “If you look at just a small patch of it, you just see fuzziness.”

Hamilton and his colleagues were finally able to see the behemoth ring with the infrared capability of the Spitzer Space Telescope.

Spitzer was able to detect the sunlight reflected by the tiny dark black particles. The discovery is detailed in the Oct. 8 issue of the journal Nature.

The particles were likely created when asteroids, meteors or other bodies collided with Phoebe over the eons. While some of the particles are small enough to drift out of Saturn’s gravitational grasp and into interplanetary space, others drift inwards toward the planet, where some get stuck to the leading hemisphere of Iapetus, which trawls through them. Periodic collisions replace the particles lost in these ways.

Interestingly, Phoebe and its associated dust ring travel in the opposite direction of Saturn’s other rings and satellites.

The tiny particles are extremely diffuse, with only about 20 in every cubic kilometer of the ring, Hamilton said.

“If you were there, you wouldn’t know you were in a ring,” he said.

And because the other gas giants are known to have far-out, irregular satellites like Phoebe, it is likely that they also have similarly large, diffuse rings orbiting millions of kilometers out.

“I think this is the tip of the iceberg,” Hamilton said.

## Quasi-Stellar Objects (QSO)

by *Ma. Angela Lourdes B. Lequiron*

Significance of studying and observing quasar

1. It indicates the fate of the Universe.
2. It provides us insights about the composition of early stages of the Universe.
3. It provides new window which gives us an insight into what kind of stars ended the Dark Ages.
4. It is also a velocity indicator.

What is QUASAR?

- is a short form of QUASI- STELLAR OBJECT (QSO).
- they are the oldest and most distant objects in the

Universe.



- their very powerful luminosity was said to be due to its SUPERMASSIVE BLACK HOLE who feeds up the accreting materials around it such as gas and dust.

Comparison and Contrast of Quasar with:

Nebula - it is a large cloud composed of gas and dust which enables it to manufacture stars.

- it doesn’t have black hole at its center.

SUN - it is a main sequence star.

-its luminosity depends on the nuclear fusion at its center.

*Continued on page 6*



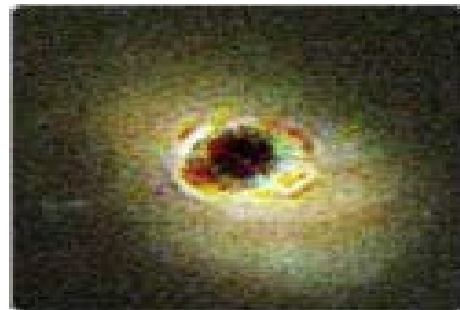
Nebula

Galaxies



The Nearest Quasar

Quasar 3C 273 located in the constellation Virgo was the nearest and brightest quasar discovered. Its distance is about 2.44 billion light years away with apparent magnitude of 12.8. And with the distance



OTHER ORDINARY GALAXIES

- composed of gas and dust which allows star formation.
- it has a black hole at its center but not as massive as the black hole at the center of the quasar.

of 33 light years, it will have its absolute magnitude of -26.7 which means that it will shine out as bright as the Sun at that certain

distance. This quasar can be seen with the aid of small telescopes but not with naked eye.

The Farthest Quasar Observable

The most distant known quasar, CFHQS J2329-0301. It is likely billions of



light years away and so is seen when the Universe was younger.

Quasar's Luminosity compared with our Sun, other stars, galaxies

Quasar is the most luminous object in the Universe. Its luminosity is about one trillion (10<sup>12</sup>) as the Sun, or about 100 times that of the total light of average giant galaxies like our Milky Way. But the luminosity of quasars appears to decline over time.

Reason for Quasar's powerful luminosity

The quasars' powerful luminosity are believed to be powered by a supermassive black hole which is 100 million solar masses. The black hole causes the accreting materials to increase their velocity and it also causes friction among particles, thus, they will collide with each other. This collision causes unimaginable amount of heat and energy, this process is the one responsible for making quasars very luminous and allows us to observe them even at their great distance.

Situation # 1:

Assuming you are at the nearby

Continued on page 7

farthest quasar which is at the boundary of the observable universe and provided that Hubble Law holds at that distance (where they are receding more than the speed of light), would you see the object that pre-cede it?

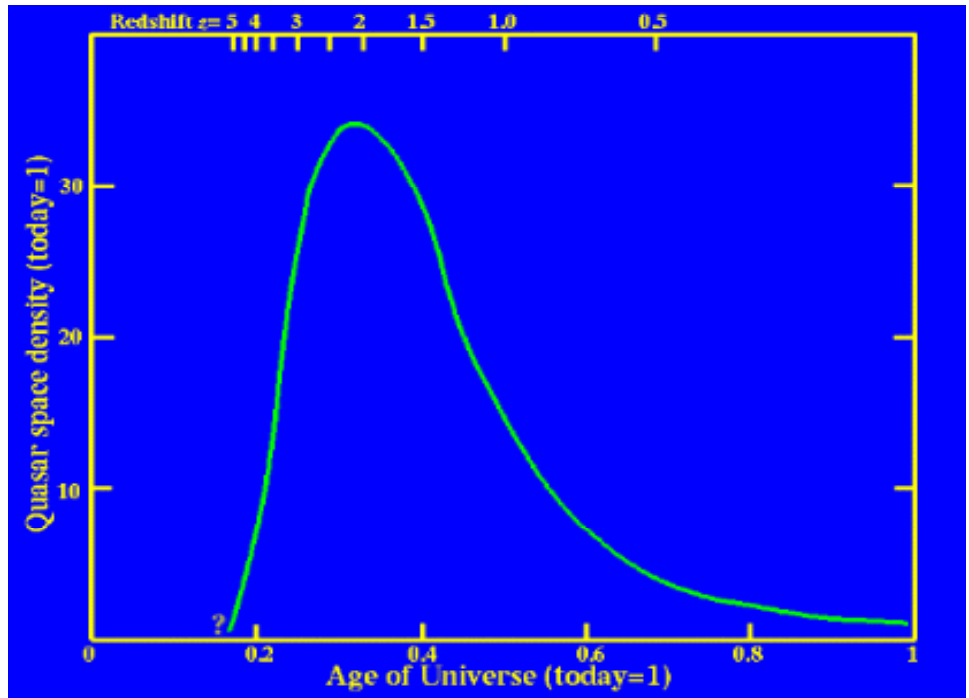
Assumption:

Human's eye can only perceive manageable speed such as speed of light. If any object is moving faster than the speed of light it is impossible for us to be able to see those objects.

Hubble's Law

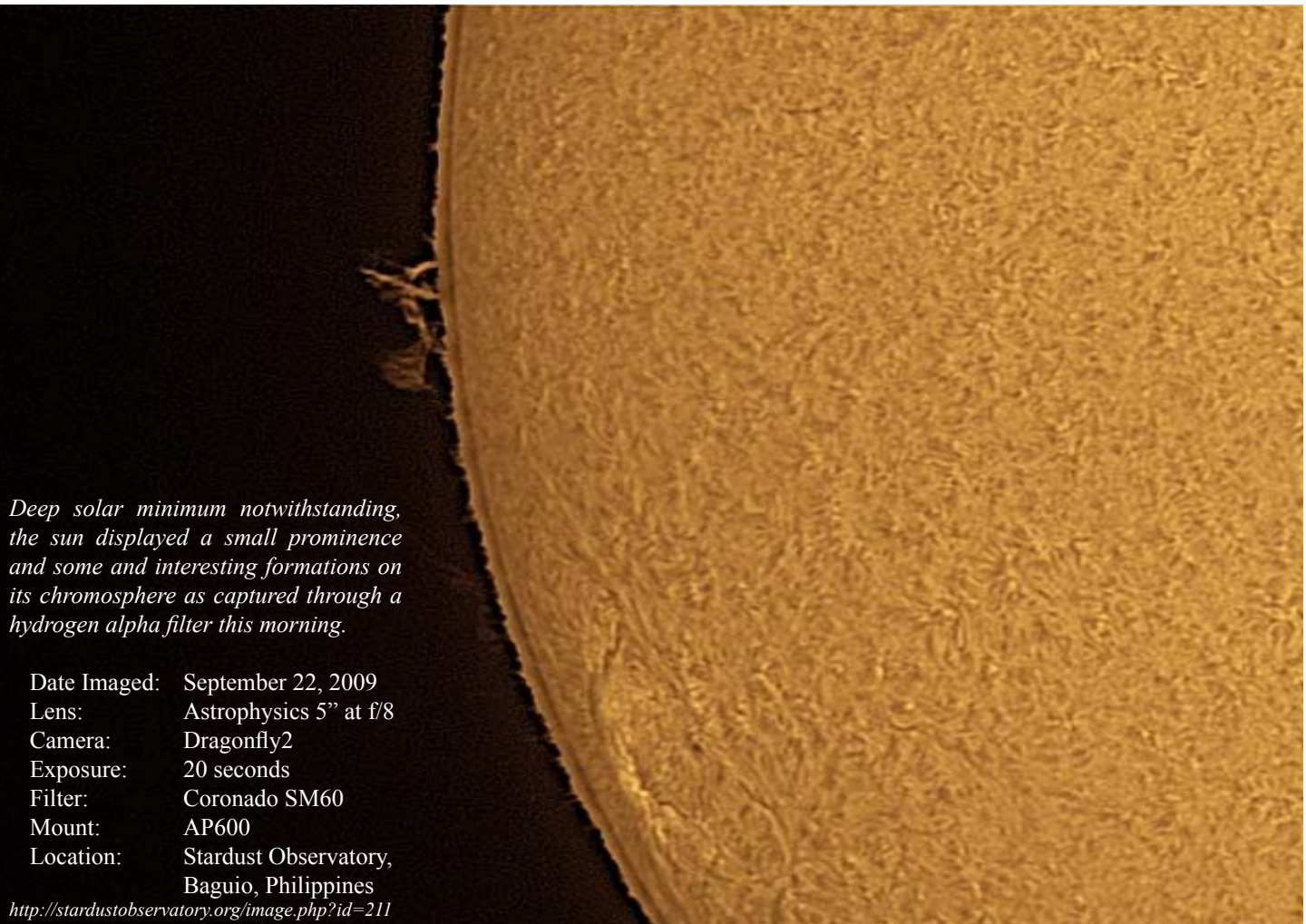
- this law states that the distance of various galaxy is directly proportional to its radial velocity.

$$v=Hd$$



# ASTROPHOTOGRAPHY

*by John Nassr*



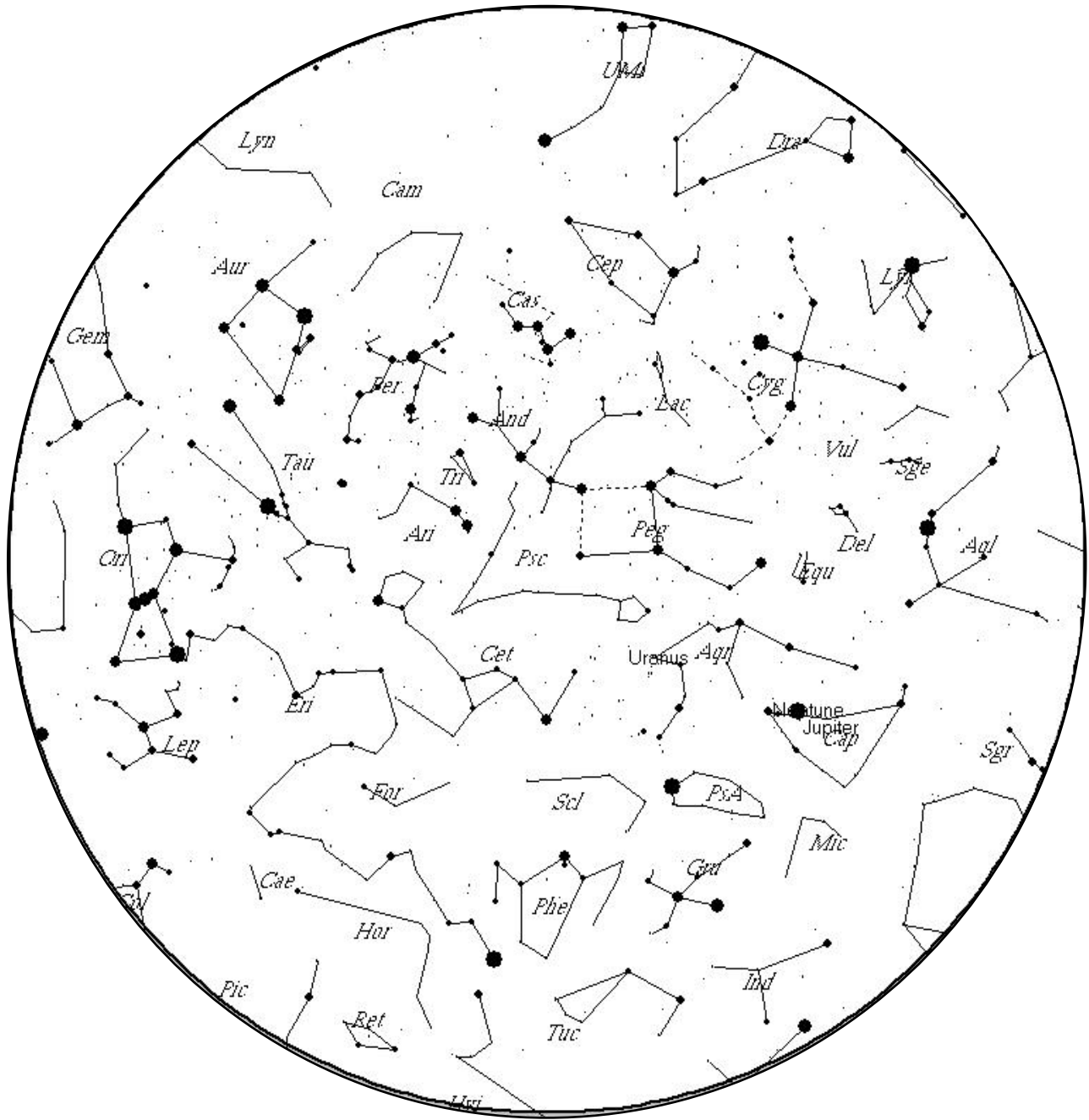
*Deep solar minimum notwithstanding, the sun displayed a small prominence and some and interesting formations on its chromosphere as captured through a hydrogen alpha filter this morning.*

Date Imaged: September 22, 2009  
 Lens: Astrophysics 5" at f/8  
 Camera: Dragonfly2  
 Exposure: 20 seconds  
 Filter: Coronado SM60  
 Mount: AP600  
 Location: Stardust Observatory,  
 Baguio, Philippines

<http://stardustobservatory.org/image.php?id=211>



# Monthly Star Map – November 2009



This map shows the sky at 9pm on November 15, 2009 as seen from the latitude of Metro Manila, Philippines with North on top and the zenith at the center. The large circle represents the horizon. Star limiting magnitude is 5.5. Deep sky limiting magnitude is 7.0.

*Prepared by PAS Observation Committee using SkyMap Pro 9 software.*