



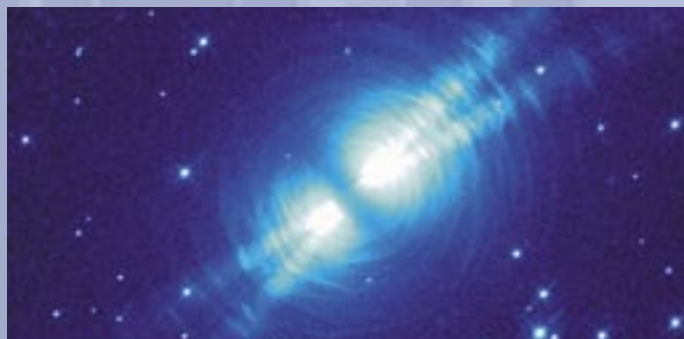
## INDEX

1. Welcome
2. SkyWatch 2006 Contest
  - 2.1 About the contest
  - 2.2 First phase of the SkyWatch 2006 contest
  - 2.3 Second phase of the SkyWatch 2006 contest
  - 2.4 Winners
3. Remotely operate a telescope
  - 3.1 Demonstration at Xplora Science Teachers Conference
  - 3.2 New D-Space Service
4. The Perseids meteor shower
5. Partial Lunar eclipse, visible from D-Space telescopes, on the 7th of September
6. Annular Solar Eclipse of 2006 September 22
7. The Herstmonceux Science Centre Astronomy Festival 2006
8. Transit of Mercury across the Sun
9. Future events
10. Glossary
11. Editorial

## 1. Welcome

Dear D-Spacers,

What was SkyWatch 2006 Contest? Who were the winners? Can you operate a telescope from a web page? What are Perseids? When was the solar eclipse? The partial Lunar eclipse? What is the Herstmonceux Science Centre Astronomy Festival 2006? Where is Mercury going?



In this issue, the 5th D-Space newsletter, you will find all the answers. For any question you may have, don't hesitate to ask us. Please use our email address [dspace@ea.gr](mailto:dspace@ea.gr) or use D-Space Forum in Communication Area at D-Space web site: [www.discoveryspace.net](http://www.discoveryspace.net)

Nikos Dalamagkas  
Editor of the DSpace Newsletter

## 2. SkyWatch 2006 Contest

### 2.1 About the contest

The SkyWatch 2006 contest (<http://www.discoveryspace.net/skywatch2006>) has been initiated on late March and was an on-going event for the D-Space program. It went through a number of phases: namely the call for applications, the first screening and the final phase. The contest addressed educators and teachers, mainly in the fields of Astronomy, Physics or Mathematics, who will be requested to propose interesting ideas and consequently implement them as scenarios for utilising a network of robotic telescopes in the classroom for educational purposes.



## 2.2 First phase of the SkyWatch 2006 contest

During 1st phase, the participants proposed ideas on designing lesson plans based on the use of Astronomical archives as well as the D-Space network of robotic telescopes, which afterwards (during the 2nd phase) would be developed and implemented them in the classroom. According to their selection from the pool of the contest's 5 suggested contest topics, participants were free to use additional scientific material from other sources, but the use of at least one observation from the D-Space data base is obligatory.

All projects should have been presented and assessed following specific criteria that had been applied by the project's scientific committee.

An initial selection procedure established that led to the creation of a pool of the 10 best projects.

Participants should have also described their request for observations that would be conducted by the D-Space Network of Robotic Telescopes if they succeed to qualify to the 2nd phase of the contest.

## 2.3 Second phase of the SkyWatch 2006 contest

The observation requests of the 10 best scenarios qualified to the 2nd phase of the contest scheduled

in the software of the D-Space Network of Robotic Telescopes. In this phase the participants had been assigned to implement an educational scenario in the classroom based on each project's main idea. Since the time in which the participants provided with their observations depends on exogenous parameters such as weather conditions and visibility of the specific astronomical subject during the period of the 2nd phase, the requested task as well as the overall evaluation did not depend on whether the participants included these observations in their project or not.

The final submission included the initial project of the 1st phase as well as the results of the realised lessons of the 2nd phase. The final evaluation of the submitted projects followed and led to the distinction of the 5 best educational scenarios.

## 2.4 Winners

The contest underwent the final phase where those previously selected best scenarios were the cause for bringing the teachers to Xplora Science Teachers Conference, held at CERN in June, with paid expenses from D-Space project. The winners had the opportunity to visit CERN and participate at the conference. Among others workshops they participated at D-Space workshop, where an extensive training



provided by D-Space Team.

There were 5 of the contest participants selected to be awarded and presented at the conference. The winners in alphabetical order were:

**Daniel Jose Mendicini**

project titled *“Search of Structure Hairspring Hidden in Galaxies Elliptic Midgets”*

**David Pundak**

project titled *“Solar Rotation and Activity from Galileo to the Present”*

**Inese Leitane and Janis Leitans**

project titled *“Solar System Planets and Moons”*

**Lev Pustilnik**

project titled *“Study of Evolution of Normal Galaxies through Evolution of Stars and Nebulas”*

**Veselka Radeva and Hristo Stoev**

project titled *“Birth of Stars”*

### 3. Remotely operate a telescope

#### 3.1 Demonstration at Xplora Science Teachers Conference

The last day of Xplora Science Teachers Conference, before the SkyWatch 2006 Contest award ceremony a new D-Space service presented. Dr. Ioannis Papamastorakis demonstrated the use of robotic telescopes by remotely operate a telescope located in Skinakas Observatory in Crete, using a web page. There was a camera next to the telescope, broadcasted the event and the participants of the conference could see the telescope moving.

#### 3.2 New D-Space Service

This service bring to students, teachers, researchers and individuals (amateur astronomers, visitors of science parks) all around the world the opportunity to use remotely controlled robotic telescopes in real time giving accessibility to unique resources as the sky is a vast and unique laboratory of science, always in operation, accessible at all times from everybody from everywhere, where all sorts of interesting physical phenomena take place most of which is impossible to reproduce in any scientific laboratory. The new service offers to users a unique possibility to use a scientific instrument remotely, especially as telescopes are expensive and unreachable by most of the users.

This new feature is for advanced and experienced users because remotely operating a telescope in real

time may cause technical problems and of course the time a telescope can be operated by all users is not infinite. Entering the new User Interface of D-Space, apart of submitting your scheduled requests, you can now operate Skinakas telescope in real time by giving the coordinates of the object you wish to shoot, and the telescope immediately starts moving to fulfil your request. To become authorized user, contact the Scientific Committee of D-Space (dspace@ea.gr), sending your observing proposal and your scientific background. The Scientific Committee will contact you in order to give you the username and password for a specific date.

### 4. The Perseids meteor shower

The Perseids are a prolific meteor shower associated with the comet Swift-Tuttle. The shower is visible from mid-July each year, but the bulk of its activity falls between August 8 and 14 with a peak on August 12. During the peak, rates of a hundred or more meteors per hour can be registered.

Meteor showers can be seen when Earth moves through a meteor stream. The stream in this case is called the Perseid cloud and it stretches along



the orbit of the Comet Swift-Tuttle. The cloud is composed of particles ejected by the comet as it passed by the Sun. Most of the dust in the cloud today is approximately a thousand years old. However, there is also a relatively young filament of dust in the stream that boiled off the comet in 1862. The approximate rate of meteors originating from this filament is much higher than normal.

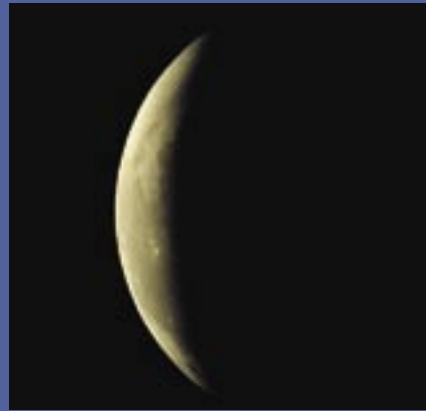
The Perseids are called so because the point they appear to be coming from, called the radiant, is in the constellation of Perseus, which is a northern constellation, named after the Greek hero who slew the monster Medusa. However, they can be spotted all around the sky. Because of the positioning of Swift-Tuttle's orbit, Perseids are mostly visible on the northern hemisphere.

The famous Perseid meteor shower has been observed for about 2000 years, with the first known information on these meteors coming from the far east. In early Europe, the Perseids came to be known as the “tears of St. Lawrence.”

To experience the shower in its full, one should observe from a point far outside any large cities, where stars are not dimmed by light pollution.

### 5. Partial Lunar eclipse, visible from D-Space SGAO telescopes, on the 7th of September

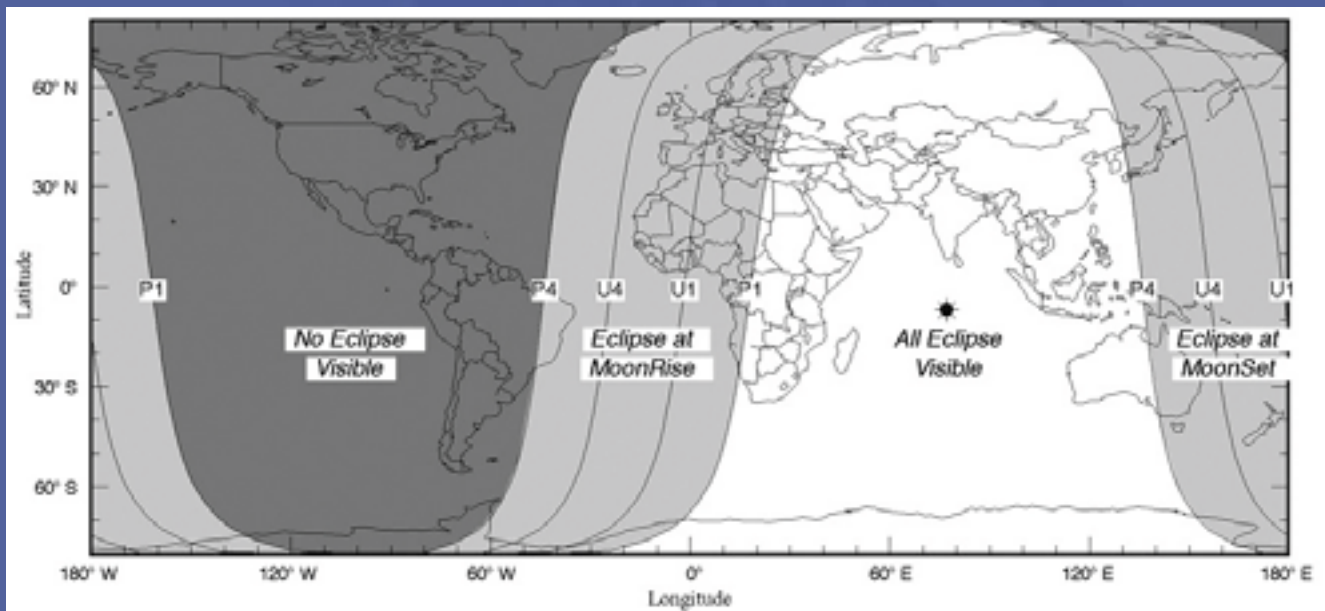
All of this partial lunar eclipse is visible from eastern Africa, India and central Asia, and thus from SGAO Telescopes, which are available in D-Space network of telescopes. Many users used our service, and realized their requests, observing the Moon, especially with the Sea of Galilee Observatory



Magnitude of the eclipse: 0.189

In spite of the fact that the eclipse was shallow (the Moon's northern limb dipped just 6.3 arc-minutes into Earth's dark

umbral shadow), the partial phase lasted over 1 1/2 hours. This was due to the grazing geometry of the Moon and umbra. At the instant of greatest eclipse (18:51 UT), the Moon stood near the zenith for observers in the central Indian Ocean. At that time, the umbral eclipse magnitude was 0.190. The event was best seen from Africa, Asia, Australia and Eastern Europe.



(SGAO) telescopes.

The beginning of the umbral phase visible in Asia, Australia, Europe except extreme western part, Africa except extreme western part, Antarctica except Marie Byrd Land and Antarctic Peninsula, the Indian Ocean, the western Pacific Ocean, and the eastern South Atlantic Ocean; the end visible in Asia, Australia, Europe, Africa, most of Antarctica, the Indian Ocean, the western Pacific Ocean, and the eastern Atlantic Ocean.

Moon entered penumbra:	16 42.3 UT
Moon entered umbra:	18 05.0 UT
Middle of eclipse:	18 51.3 UT
Moon left umbra:	19 37.6 UT
Moon left penumbra:	21 00.3 UT

More information can be found at:

<http://sunearth.gsfc.nasa.gov/eclipse/OH/image1/LE2006Sep07-Fig4.GIF> and

<http://www.popastro.com/spapop/skydiary.pdf>

### 6. Annular Solar Eclipse of 2006 September 22

On Friday, 2006 September 22, an annular eclipse of the Sun will be visible from within a narrow corridor which traverses half the Earth. The path of the Moon's antumbral shadow begins in northern South America and crosses the South Atlantic with no further landfall. A partial eclipse will be seen from a much larger region including South America, the eastern



Caribbean, western Africa, and Antarctica.

The path of the annular eclipse begins in Guyana at 09:48 UT when the Moon's antumbral shadow meets Earth and forms a

323 kilometre wide corridor.

Guyana's capitol city Georgetown lies just a few kilometres outside the path's northern limit. Here, a

magnitude 0.920 partial eclipse will be

seen at sunrise. On the central line 160 kilometres south, the duration of annularity is 5 minutes 31 seconds.

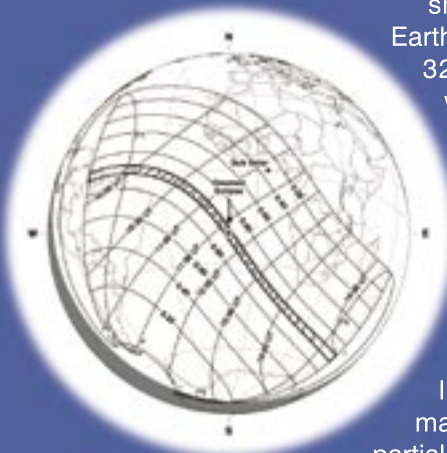
Rushing east, the antumbra quickly enters Surinam where its capitol city Paramaribo lies deep within the antumbral path. Maximum eclipse in Paramaribo

occurs at 09:51 UT, the Sun's altitude is  $5^\circ$  and the duration of annularity is 5 minutes 1 seconds. Continuing into French Guiana, the capitol city Cayenne stands just 10 kilometres south of the central line. Maximum eclipse occurs at 09:53 UT as the Sun stands  $8^\circ$  above the eastern horizon during an annular phase lasting 5 minutes 42 seconds.

The southern edge of the antumbra briefly clips the north coast of Brazil before spending the next three and a half hours sweeping across the South Atlantic. Greatest eclipse occurs at 11:40:11 UT. The annular duration is 7 minutes 9 seconds, the path width is 261 kilometres and the Sun is  $66^\circ$  above the featureless horizon of the open ocean. The central track runs south of the African continent and nearly reaches Kerguelen Island before ending at local sunset (13:31 UT). During its 3 hour 40 minute flight across our planet, the Moon's antumbra travels about 13,800 kilometres and covers 0.83% of Earth's surface area

This is the 16th eclipse of Saros 144. The series began with the first of eight partial eclipses on 1736 Apr 11. The first central eclipse was annular in the Southern Hemisphere on 1880 Jul 07. The series will produce 39 annular eclipses the last of which is 2565 Aug 27. The series terminates on 2980 May 05 after 23 more partial eclipses. Complete details for Saros 144 may be found at:

<http://sunearth.gsfc.nasa.gov/eclipse/SEsaros/SEsaros144.html>





## 7. The Herstmonceux Science Centre Astronomy Festival 2006

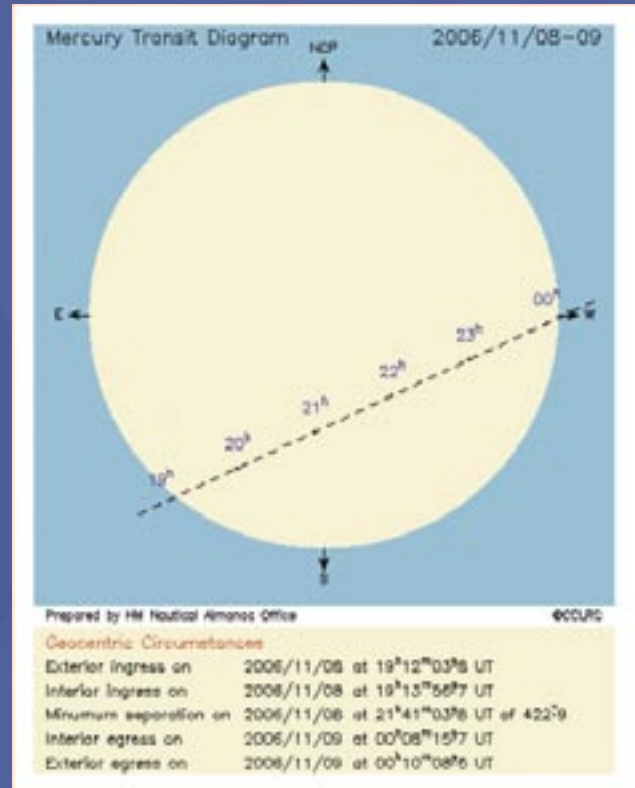
The Observatory Science Centre in association with Pulsar Optical and Telescope House present: The Herstmonceux Science Centre Astronomy Festival, September 29, 30 and October 1, 2006.

Camping under the backdrop of the telescope domes will be available on Friday, Saturday and Sunday. There will be lectures, tours around the telescopes, visits to the Space Geodesy Facility and the Radio Shack, trade stalls and access to all the hands-on science exhibits throughout the centre. Telescopes not open to the public during the day will be open for evening viewing sessions. The centre is in the grounds of Herstmonceux castle which is well worth a visit during your stay. DSpace will be represented in the festival.

For more details see <http://www.the-observatory.org>

## 8. Transit of Mercury across the Sun

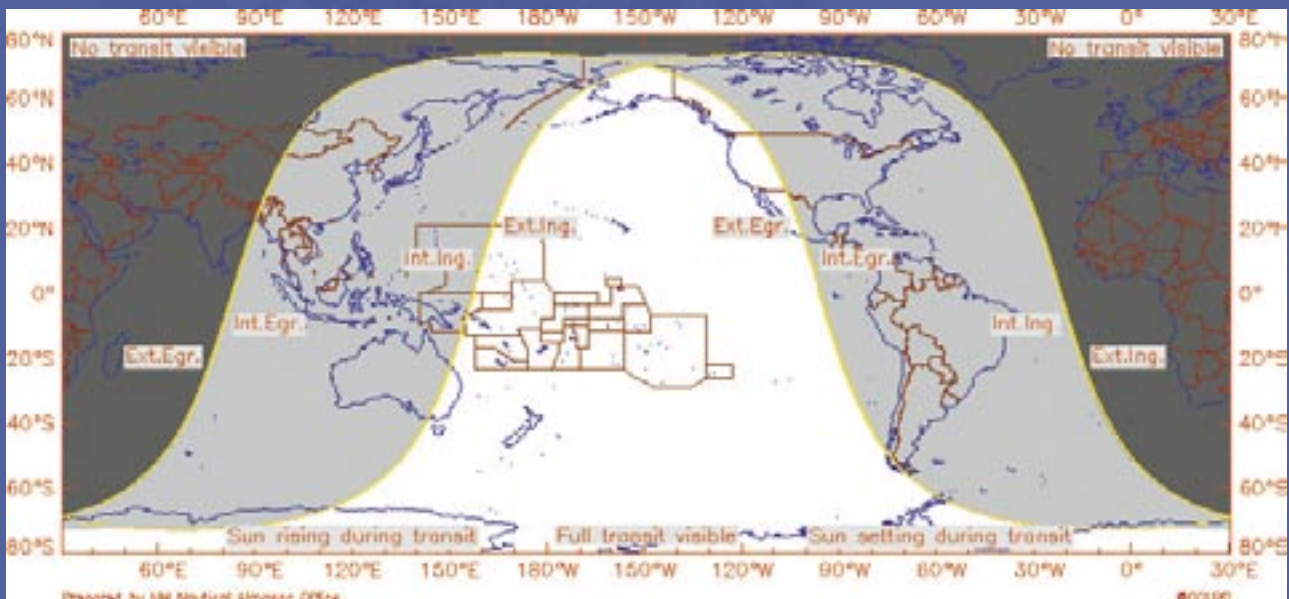
A transit of Mercury across the Sun takes place when the planet Mercury comes between the Sun and the Earth, and Mercury is seen as a small black dot



moving across the face of the Sun.

Transits of Mercury with respect to Earth are much more frequent than transits of Venus, with about 13 or 14 per century, in part because Mercury is closer to the Sun and orbits it faster.

Transits of Mercury can happen in May or November.



November transits occur at intervals of 7, 13, or 33 years; May transits only occur at intervals of 13 or 33 years. The last two transits were in 1999 and 2003; the next two will occur in 2006 and 2016.

During a May transit, Mercury is near aphelion and has an angular diameter of 12"; during a November transit, it is near perihelion and has an angular diameter of 10".

## 9. Future events:

### 9.1 Next SkyWatch Contest

In the near future the next SkyWatch Contest will be initiated. If you have already participated at the past two SkyWatch Contests, you already know what a magnificent experience it is. On the other hand, this contest may be the beginning of your new astronomical era. Find more in a few days at: <http://www.discoveryspace.net/skywatch2007/>

[www.discoveryspace.net/skywatch2007/](http://www.discoveryspace.net/skywatch2007/)

### 9.2 D-Space Conference

At the beginning of 2007, a conference will be organized in the context of D-Space project. The conference will focus on new and advanced technologies in education, ICT, teaching approaches, science centres in education, and more. Keep in touch in order to be informed about the conference. There will be an announcement at D-Space web site: [www.discoveryspace.net](http://www.discoveryspace.net)

### 9.3 Calendar of events

The following table is a calendar of astronomical events until the end of the year. Get ready and shine your telescopes. If you don't have one, or you prefer images from bigger telescopes, D-Space will serve you.

#### September 5, 2006

Uranus at Opposition.

#### September 7, 2006

Partial Lunar Eclipse. The eclipse will be visible throughout most of Europe, Africa, Asia, and Australia.

#### September 22, 2006

Annular Solar Eclipse. The path of annularity will begin off the coast of Brazil and move east and south through the Atlantic Ocean where it will end just off the coast of Antarctica. A partial eclipse will be visible throughout most of South America and western Africa.

#### September 23, 2006

The Autumnal Equinox occurs in the northern hemisphere at 04:03 UT. There will be equal amounts of day and night. This is also the first day of fall.

#### October 21-22, 2006

Orionids Meteor Shower. The Orionids is an average shower producing about 20 meteors per hour at their peak. The shower will peak on the 21st, but some meteors can be seen from October 15 - 29. This is a great year for the Orionids. The new moon means the darkest possible sky. Those in dark locations will be able to see even the faintest meteors. Best viewing will be to the east after midnight.

#### November 8, 2006

Transit of Mercury Across the Sun. This rare event will be fully visible only in the Pacific Ocean regions, but observers in North & South America, Australia, and eastern Asia should be able to see at least a partial transit at sunrise or sunset. The planet will appear as a tiny black moving slowly across the disc of the Sun. The transit will take about 5 hours to complete and will require a telescope with a full-aperture solar filter for viewing.

#### November 17, 2006

Leonid Meteor Shower. The Leonids is one of the better meteor showers to observe, producing an average of 40 meteors per hour at their peak. The shower itself has a cyclic peak year every 33 years where hundreds of meteors can be seen each hour. The last of these showers occurred in 2001.

The shower peaks this year on November 17, but you can see some meteors from November 13 - 20. The nearly-new moon should not be a problem this year for the Leonids. Even the faintest meteors should be visible this year. Look for the shower radiating from the constellation Leo after midnight.

#### **December 14, 2006**

Geminids Meteor Shower. Considered by many to be the best meteor shower in the heavens, the Geminids are known for producing up to 60 multicolored meteors per hour at their peak. The peak night this year is December 14. Some meteors should be visible from December 6 - 19. The first quarter moon should set shortly after midnight, leaving a dark sky for observing even the faintest meteors. The radiant point for this shower will be in the constellation of Gemini. Best viewing is usually to the east after midnight.

#### **December 20, 2006**

The Winter Solstice occurs in the northern hemisphere at 00:20 UT. The Sun is at its lowest point in the sky and it will be the shortest day of the year. This is also the first day of winter.

## **10. Glossary**

In this issue magnitude is presented.

### **Magnitude**

The degree of brightness of a star or other object in the sky according to a scale on which the brightest star has a magnitude -1.4 and the faintest visible star has magnitude 6. Sometimes referred to as apparent magnitude. In this scale, each number is 2.5 times the brightness of the previous number. Thus a star with a magnitude of 1 is 100 times brighter than one with a visual magnitude of 6.

### **Apparent Magnitude**

The apparent brightness of an object in the sky as it appears to an observer on Earth. Bright objects have a low apparent magnitude while dim objects will have a higher apparent magnitude.

### **Absolute Magnitude**

A scale for measuring the actual brightness of a celestial object without accounting for the distance of the object. Absolute magnitude measures how bright an object would appear if it were exactly 10 parsecs (about 33 light years) away from Earth. On this scale, the Sun has an absolute magnitude of +4.8 while it has an apparent magnitude of -26.7 because it is so close.

### **Visual Magnitude**

A scale used by astronomers to measure the brightness of a star or other celestial object. Visual magnitude measures only the visible light from the object. On this scale, bright objects have a lower number than dim objects.

## **11. Editorial**

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