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It's Saturn time!

by Jane Houston Jones

It's Saturn time!
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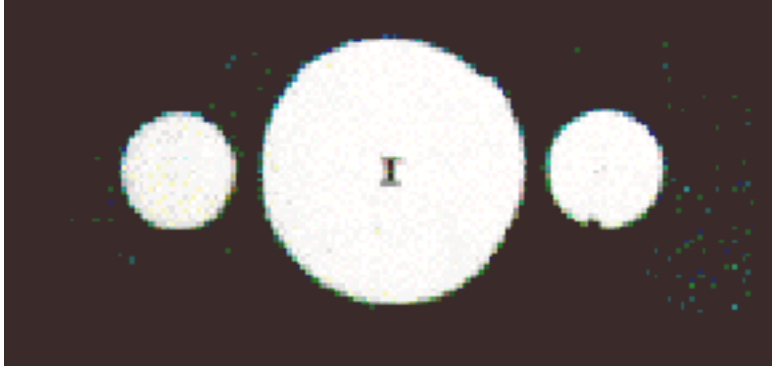
I'll never forget my first view of Saturn. It was a crisp clear winter night many years ago, and I had just completed making my first reflector telescope. I couldn't wait to look through it. I aimed my telescope at the bright golden object in the sky. After a few swing-bys, I finally found it. I gasped with wonder at the far away world I was gazing at. Now, every time I show Saturn to people, I relive that first exciting moment.

The view of Saturn this winter is about as good as it ever gets. The earth and sun passed through the ring plane in 1995 and 1996 providing a nearly edge-on viewing geometry. Since then the ring tilt increased year by year to a maximum possible tilt of 27 percent in early 2003. This winter, the ring tilt compares favorably to last year, at 26 percent. You can see and learn about the ring tilt in the multi-year Hubble Telescope image of Saturn.

The Cassini spacecraft speeds toward Saturn at 21,500 kilometers (13,000 miles) per hour and will reach Saturn just as the ringed planet disappears from our nighttime view in June. Don't worry, though. Saturn will be back in view after it emerges from behind the sun later in the year. That means you'll be able to view Saturn with the unaided eye or with telescopes when the Huygens probe descends into the atmosphere of Titan. For more information visit the Cassini-Huygens Mission to Saturn and Titan, website.

Historical observations

Saturn was the outermost of the known planets until the discovery of Uranus in 1781. Galileo first turned his telescope on Saturn on July 25, 1610 and it looked like three separate objects. His telescope was powerful enough to show the rings but made them appear as lobes on either side of the planet. Galileo was puzzled when the lobes vanished a few years later.



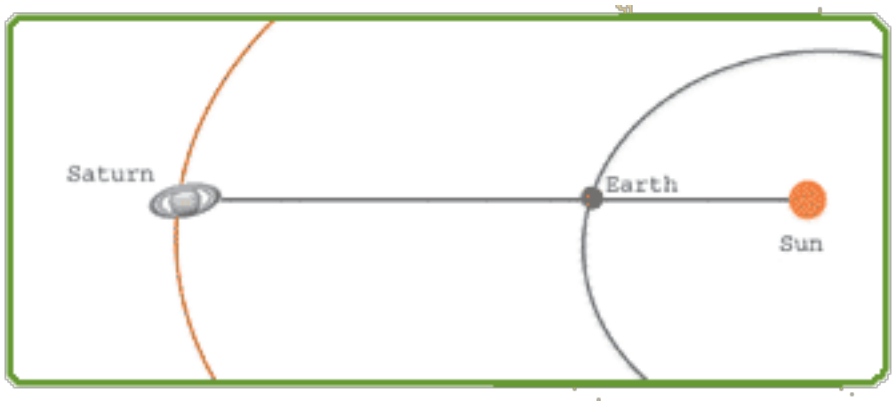
Galileo's first sketch of Saturn. When Galileo first turned his telescope on Saturn in 1610, he was struck by the odd appearance of the planet. His telescope was extremely crude by today's standards - magnifying just 20 times and having fairly crude optics. Galileo thought he was seeing a three-lobed planet. "I have observed the highest planet to be tripled-bodied. This is to say that to my very great amazement Saturn was seen to me to be not a single star, but three together, which almost touch each other," he wrote. Galileo's first known sketch of the planet Saturn corresponds perfectly to this description.

For a modern day comparison, look at this image taken by an amateur astronomer using a small telescope not much bigger than Galileo's telescope.

Image taken by amateur astronomer David Rosenthal using a 90mm telescope.

Observing Saturn today

On Dec. 31, 2003, Saturn reached opposition. An object is at opposition when the sun is on one side of the Earth and the object is on the opposite side. The result is that the object is fully illuminated by the Sun and appears disk-like. We see a great example of an opposition every month. The full moon is on one side of the Earth and the sun is on the opposite.



Geometry of opposition. The size of earth's orbit is exaggerated for clarity. Saturn is 9 1/2 times farther from the sun than Earth. Image courtesy of Celestron Telescopes.

When and where can I view Saturn?

The best current views of Saturn are from late December 2003 through the end of March 2004. Saturn won't disappear from our view until late June, but will be lower in the sky, and you'll be viewing through more layers of the earth's atmosphere. Saturn will look more like a fuzzy oval when it is lower on the horizon. Saturn appears near the feet of Gemini, one constellation northeast of the familiar constellation Orion. To find Orion and Gemini, you can use the ASP Mercury magazine star chart. This handy link will let you create a special star chart showing Saturn tailored to your own location.

What will Saturn look like? It depends. You may be able to see the planet and rings clearly, depending on a lot of variables from optics to eyepieces to sky conditions. If you are observing Saturn at low power through a small 60mm - 100mm aperture telescope it will look like a golden oval. Some telescopes will show the rings distinctly and some won't. Larger telescopes will reveal gold and brown cloud bands on the planet and even the Cassini division, the large gap between the rings of Saturn. You should be able to see the moon Titan, and perhaps several of the other moons. Most importantly, view Saturn when it is highest in the sky so there is less atmosphere between your view and your target. February and March will be the best months for awesome views.

In June Saturn, along with its planetary companions Mars, Venus and Mercury, will be too low in the western sunset sky for viewing. Here is a listing of optimum times to observe Saturn this winter and spring.

Here are some excellent dates to consider for a school star party. Contact your local astronomy club, or any number of excellent outreach organizations for assistance in organizing your event.

February 15 - Saturn best viewed between sunset to 1:00 a.m. February 28th is the first quarter moon night. Jupiter joins the other planets by 8:30 p.m. Saturn is near the moon on the nights of February 2-3 and February 29-March 1.

March 15th - Saturn best between sunset to 11:00 p.m. For about 2 weeks commencing March 22, all five naked eye planets are visible in the evening sky. Mercury begins its best evening apparition of the year at month-end setting 1 1/2 hour after the sun. Venus stands 25 degrees high in the west and sets near 10:00 p.m. Mars is 40 degrees high in the western sky and sets in the west-northwest at midnight. Jupiter is at opposition March 4, and transits more than 50 degrees high before midnight. Saturn is stationary on March 7 and returns to direct (eastward) motion. It stands 65 degrees high in the south-southwest at the end of the evening twilight and sets at 2:30 a.m.

April brings daylight savings time to most states, and a later sunset. Saturn is high in the west at sunset and doesn't set until midnight. On Sunday April 25th, Saturn will be 5 degrees from the crescent moon in the early evening.

On May 10, a nearly straight-line just over 15 degrees long from upper left to lower right connects Saturn, Mars and Venus. On May 24th Mars is in conjunction with Saturn, passing just 1 degree from it, from most locations.

By month end, Saturn is visible only during evening twilight low in the west-northwest. It is lost in the glare of the setting sun in June, returning to the pre-dawn sky by month-end August. In December 2004, Saturn will be rising soon after the end of evening twilight.

Activities

Observing Saturn in the sky.

Make a Saturn model.

Paper plate Saturn.

Universe in the Classroom on Saturn #40 1997.

Activity: A Grapefruit Saturn.

Outreach

Saturn Observation Campaign

Night Sky Network

Solar System Ambassadors

Northern California

Southern California

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