

# OBSERVER

## HOLIDAY LIGHTS

### ANGEL NEBULA

The Angel Nebula is a dim and rarely photographed or observed emission and reflection nebula in the constellation Monoceros (the Unicorn) just off the east end of Orion's belt. The angel figure consists of NGC 2170 and Van den Bergh 67, 68, and 69 that form the head, red heart, the wings and the flowing robe. The large emission nebula to the south (right) of the angel and other blue-red nebulae finish the tableau. This complex is about 2,600 light-years from Earth, energized by young and very hot B2 stars forming from the dust of a giant molecular cloud known as Monoceros R2. It was captured over two nights in October and November at the EGK Dark Site with a Canon 450D and AstroTech AT8IN. Total exposure time was 2 hours and 47 minutes of RGB.

Image © Darrell Dodge

### Calendar

6.....	Last quarter moon
13.....	New moon
19.....	First quarter moon
21.....	Winter solstice
28.....	Full moon

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## DECEMBER SKIES

by Dennis Cochran

Christmas is coming and Santa Claus, too—he'll fill up your stocking and re-sole your shoe! At least we hope so. If your situation is such that you don't expect a present this year, think of giving to others instead: it's more fun! Being there to hand out the gifts is the most fun, especially if the recipients haven't been expecting much from the present-giving aspect of this old religious festival. Ask around or maybe Google around to find out what opportunities of this sort are in your community, and this year do it!

Originally this year-end celebration was a pagan one featuring the Winter Solstice, which is December 21, 4:12 MST this year. The Stonehenge builders certainly had the solstice on their minds and went to a lot of trouble to celebrate it. I've heard that religious scholars think Christ was born at another time; in any case, the old winter festival was made into Christmas. Merry-making

was always part of it: think Wassail, Wassail and then God Rest Ye Merry Gentlemen. The gift-giving may have come later. Long winter evenings gave our ancestors time to craft gifts for family and friends and astronomers more time to observe.

Astronomers are easy to shop for, since ours is a gadget-heavy hobby. It's also literature-laden, with books and magazines, planispheres and such galore on our Christmas lists. We'll have a "How-to-Buy-a-Telescope" talk at the Open Houses of November and December. And in late October we held our auction. In fact planispheres (circular rotating sky maps) make excellent gifts for non-astronomers, as a gentle reminder that half of nature can be seen at night.

Because the Earth orbits, at night looking away from the sun we face a different quarter of the universe than the one we saw in previous months. The winter Milky

Continued on Page 3

# PRESIDENT'S CORNER

by Ron Pearson

The Holiday Season—Thanksgiving, Hanukah and Christmas are upon us. We get together with family and friends, thankful for those still with us and all we have. We look forward to celebrating hope in late December even if you only celebrate the coming return of longer days of sunshine and warm weather. We are certainly thankful for all of you in the DAS who contribute so much of your time to the sharing of astronomy in so many ways—from Chamberlin Public Night and Open Houses to organizing meetings or other events, to mowing the weeds or other maintenance at our dark site, or just bringing your telescope out on the Observatory Park lawn to share a view with a family. Last month I mentioned that we continue to struggle to find ways to reach out to share our love of astronomy with school kids in our area. Before that issue was published some of our long time and giving members offered to take on those challenges.

It is no surprise that these long time members stepped up. It's also no surprise that over the years they have become personal friends, because as with all friends, we share common interests. When others ask for help or we need something done they step up and give of their time and talents. They give back so much more than they take. That is the good news of giving to the DAS for so many years. The bad news is that as time goes



by it really hurts to learn that at almost the same time they step up, we learn they are taken out of our line-up by illness and/or injury. Bill Ormsby, who for at least 12 or 15 years has been meeting and greeting kids and their families

at every (not just once a month) Chamberlin Tuesday Public Night and Open House, has been sidelined by a heart problem. Chuck Carlson, who has done many school star parties and other events, serves on our board, and was also the inventor of the "Denver Chair," was to fill the University Park school request. He's been sidelined by several health issues. Just recently, Norm Rosling, our retired teacher of biology and former Veep, who works Public Night and gives his optics or telescope talks to many at Chamberlin Open Houses and schools, and is always in demand at the DMNS, suffered a severe head injury while pursuing one his other hobbies just after our November Open House. He has been in I.C.U. in a Colorado Springs hospital.

The hope offered for this holiday season is not for a new eyepiece or observing list. The hope offered by our December holidays is the hope that our friends will get through these challenges and be back with us, sharing and enjoying the night sky with all of us who are thankful for their service and friendship. And we hope they know that if they are not able to give their usual 110% that we are thinking, praying and pulling for them.

Good health as well as clear skies in the coming year. ★

## Society Directory

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*The Executive Board conducts the business of the DAS at 7:30 p.m. at Chamberlin Observatory. Please see the Schedule of Events for meeting dates. All members are welcome.*

[www.denverastro.org](http://www.denverastro.org)

# DAS SCHEDULE

## DECEMBER

- 1 DAS Holiday Potluck (Takes the place of the General Membership Meeting).
- 7 E-Board Meeting at Chamberlin (Begins at 7:30 P.M.)
- 8 Chanukah begins at sunset
- 14-16 EGK Dark Sky weekend
- 22 Open House at Chamberlin Observatory (Begins at 6:00 P.M.)
- 25 Christmas Day (No Public Night)

## JANUARY

- 1 New Year's Day
- 4 E-Board Meeting at Chamberlin (Begins at 7:30 P.M.)
- 11-13 EGK Dark Sky weekend
- 19 Open House at Chamberlin Observatory (Begins at 6:00 P.M.)
- 25 General Membership Meeting at D.U.'s Olin Hall: Toshiya Ueta, PhD: Circumstellar shells; and Nomination of Officers (Begins at 7:30 P.M.)

*Public nights are held at Chamberlin Observatory every Tuesday and Thursday evenings beginning at the following times:*

- March 13 - April 14 at 8:00 P.M.*
- April 15 - August 31 at 8:30 P.M.*
- September 1 - September 30 at 8:00 P.M.*
- October 1 - March 10 at 7:00 P.M.*

*Costs to non-members are: \$3.00 adults, \$2.00 children.*

*Please make reservations via our website ([www.denverastro.org](http://www.denverastro.org)) or call (303) 871-5172.*



## DECEMBER SKIES

(CONTINUED FROM PAGE 1)

Way rises to replace the galactic-center view of late summer that was arrayed around Sagittarius. Now we are looking through the thin outer part of our galaxy's disk into the great beyond. There we find constellations like Cassiopeia, Perseus, Auriga and Cancer the Crab. Gemini and Orion lie on either side of this wispy stream of stars, gas and dust. In fact, to find the winter Milky Way look at the space between these two constellations, then search north-northwest and south-southeast to follow the stream. Later on, when Canis Major pokes his nose above the horizon and becomes especially prominent in January and February, the winter Milky Way trends along his vertical body, lying mostly east of the Big Dog.

Two meteor showers occur in December, the Geminids on the 13th and 14th, and the Ursids around Christmas. The Geminids will enjoy a new moon this year and will peak during the morning of Friday the 14th. This shower is “. . . unique in its association with an Apollo asteroid 3200 Phaeton,” (Guy Ottewill, *Astronomical Calendar 2012*.) The Ursids are likely to peak this year in the morning of Saturday the 22nd, while that evening we have our December Open House. Maybe some Ursids will still be streaking around.

Jupiter will be well up in the evening, east of the meridian and just west of the waning Milky Way in Taurus. Greenish Uranus will be west of the meridian straight below the eastern side of the Great Square of Pegasus—almost exactly one square's depth. Cetus the Sea Monster, often depicted as a whale, pokes his unassuming polygon head above the celestial equator in the high south these evenings. The V shape of neighboring Taurus sort of points towards him. There's nothing much in that five-sided head, but under it, just down-left from the Delta star of Cetus and smack on the celestial equator, is M77, a bright spiral galaxy. A compact group of NGC galaxies including NGCs 1035, 1042, 1048 and 1052 lies directly south of M77 about 9 degrees. As you know, the red star Mira the Miraculous (Omicron Ceti), the prototypical long-period variable, is the 2nd star southwest down the body of the whale. This star was miraculous because it was a part of the never-changing heavens that changed! Farther southwest is the Zeta star at 10 degrees south, and if you look northwest of that about half the distance from Mira to Zeta you will find several galaxies surrounding the spiral galaxy NGC 615.

No Bad Things this month (“. . . not a creature was stirring . . .”). Merry Christmas to all and to all a good night! ★



### A FAMILIAR SIGHT

Orion rises behind Taurus in the clear, cold winter skies. Ron shot this image at his observatory in Evergreen, Colorado.  
Image © Ron Pearson

## ABOUT THE DAS

Membership in the Denver Astronomical Society is open to anyone wishing to join. The DAS provides trained volunteers who host educational and public outreach events at the **University of Denver's Historic Chamberlin Observatory**, which the DAS helped place on the National Register of Historic



Places. First light at Chamberlin in 1894 was a public night of viewing, a tradition the DAS has helped maintain since its founding in 1952.

The DAS is a long-time member in good standing of the **Astronomical League** and the **International Dark Sky Association**. The DAS' mission is to provide its members a forum for increasing and sharing their knowledge of astronomy, to promote astronomical education to the public, and to preserve Historic Cham-

berlin Observatory and its telescope in cooperation with the University of Denver.

The DAS is 501 (c)(3) tax-exempt corporation and has established three tax-deductible funds: the Van Nattan-Hansen Scholarship Fund, the DAS-General Fund and the Edmund G. Kline Dark Site Fund.

More information about DAS activities and membership benefits is available on the DAS website at [www.denverastro.org](http://www.denverastro.org).



# 2013: YEAR OF THE COMETS?

by Darrell Dodge

Comets come and comets go . . . and sometimes they come back. But one thing that's always true about comets is that they're unpredictable. Every amateur astronomer has experienced unexpected delights (recently, Swan [2006], Hartley2 [2010], Holmes2 [2007] and McNaught [2007]) as well as many disappointments. My own first bust was Kahoutek in 1973-74, closely followed by the less-than-spectacular return of Comet Halley in 1986. But the approach of two comets that may brighten to naked eye visibility has raised the hopes of astronomers more than any in recent memory.

## THE GREAT COMETS OF 2013

In 2012-2013, two so-called "Great Comets" are expected, C/2011 L4 (PANSTARRS) and C/2012 S1 (ISON), along with another that may reach 7th magnitude, creating a lot of excitement among amateurs. What is so great about "Great" comets? A Great Comet is one that reaches naked eye visibility at about 0.0 magnitude; in other words, one that's visible to everyone, like Hale-Bopp and Comet Hyakutake in the 1990s. Some people who know you're into astronomy will be asking when they can see them "zoom across the sky." (Providing a great teaching moment about astronomical objects.)

On December 1st, C/2011, L4 PANSTARRS will be lurking way down in Scorpius at magnitude 11.1. From there, it plunges down to the border of Corona Australis and Telescopium on February 1st before beginning a rapid northward rise. On March 10th, when at its brightest (predicted to be magnitude 0.5 to -2), it will be just south of the ecliptic in Pisces. Unfortunately, we northern hemisphere observers will have to wait until mid-March, when it rises just before dawn. But it should still be quite a sight—as bright as -1 or -2 magnitude.

Comet S1 ISON may be the real show-off of 2013. Discovered on September 21st, 2012 by Vitali Nevski (of Belarus) and Artyom Novichonok (a Russian) using a 16-inch reflector operated for the International Scientific Optical Network (ISON), S1 ISON is probably a first-time visitor from the Oort Cloud and is expected to be a "sun-grazing comet." These are the more unpredictable of comets because their close approach to the sun and unknown composition may cause them to break up and/or be spectacular. This comet's perihelion date (closest approach to the sun), is November 28th, 2013 (Thanksgiving Day), at which time it will be less than one million miles above the Sun's surface.

One reason for the excitement about S1 ISON is the similarity of its orbit to that of the "Great Comet of 1680," which was visible in the daytime and grew a brilliant tail 70 degrees (seven fists) in length. This has suggested to some that the two comets may originate from the same place or object in the Oort Cloud; or even BE the same object. However, records suggest that the 1680 comet was probably located 253 Astronomical Units (over 20 billion miles) from Earth in September 2012, and has an orbital period of about 10,000 years.

See the box for the possible scenario that may play out beginning in October of 2013. Also see the preliminary homemade finderchart on Page 5.

For those with telescopes, the comet can be tracked during its approach all during 2012 and 2013. Right now (late November, 2012), S1 ISON is a 17th



## THE GREAT COMET OF 1680 OVER ROTTERDAM

C/1680 V1 Kirch (The Great Comet of 1680) was the first comet discovered using a telescope and was used by Isaac Newton to verify Kepler's Laws. Its orbit was similar to that of ISON, suggesting that it may be similarly bright if all goes well.

magnitude object in Cancer, moving soon into a loop near Castor and Pollux in Gemini.

The third possible bright comet for 2013 is C/2012 K5 (LINEAR). It's visible now (early December 2012), but the prospects for this comet are a bit more difficult to understand because of a lack of data. It was originally classed as an asteroid, but started sprouting a diffuse tail. This winter, it moves in the morning sky as a (predicted) magnitude 7 object from Ursa Major into Auriga and then Eridanus, becoming an evening object in early March—about the time that PANSTARRS may be lighting things up.

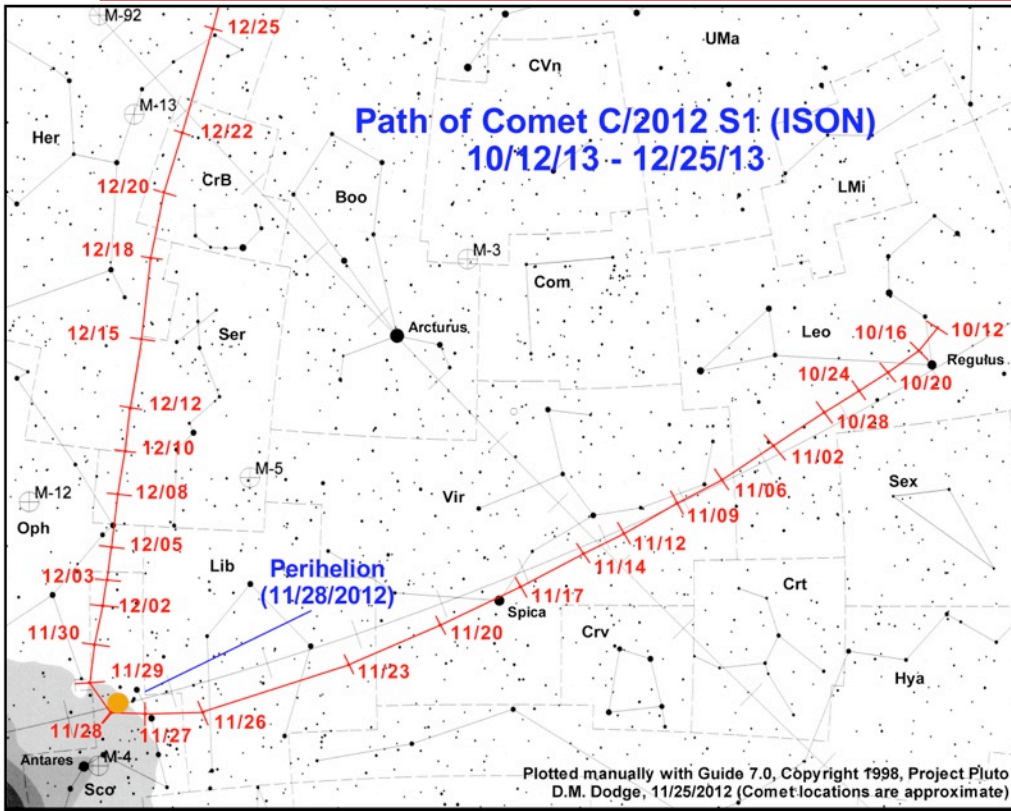
We never know when a new bright comet will be discovered or an existing one will flare up and provide an unexpected show.

## RESOURCES

All sorts of location information and finder charts for the anticipated Great Comets will be appearing soon in astronomy magazines and on the Web. For those with planetarium programs like *The Sky*, *Sky Safari*, *Starry Night Pro*, and *Guide—Project Pluto* (good for making clean finder charts), orbital and magnitude information can be plugged into the software to track the comets as they move through the sky. Just go to <http://www.minorplanetcenter.net>, scroll down to the comet you want, and click. Jim Holder's article in the February 2007 *Denver Observer* (see [www.denverastro.org/observer.html](http://www.denverastro.org/observer.html)) provides one method of making finder charts from John Walker's *Your Sky*.

For an updated list of currently visible comets, see: <http://www.aerith.net/comet/weekly/current.html>.

Will 2013 be the Year of the Comets? Only time and the unpredictable nature of comets will tell. ★



2013 FINDER CHART FOR C/2012 S1 (ISON)

**C/1012 S1 ISON OBSERVING DURING FALL-WINTER 2013-2014:**

Telescopic observation becomes practical in early September 2013, when S1 ISON rises at midnight at about 11th magnitude.

Possible scenario for Northern Hemisphere observers in the Fall of 2013 and early 2014:

- ★ **Early October:** C/2012 S1 (ISON) visible as a 9th magnitude object in Leo in the predawn sky.
- ★ **October 18th:** ISON in the same Telrad view as Mars and Regulus at 8th magnitude.
- ★ **Early November:** possibly 3rd magnitude as it passes Spica.
- ★ **On November 20th at 4 a.m.:** ISON at 1.8 magnitude, low in the eastern sky.
- ★ **November 27th:** drops out of sight as it banks into a tight turn around the Sun, but may be visible next to the Sun for extremely experienced and careful observers.
- ★ **November 30th:** December 1st: ISON's tail becomes visible, sticking up into the sky just before Sunrise.
- ★ **Very early December:** ISON visible moving to the north just before Sunrise as a possibly negative magnitude, great comet with a 70-degree tail, pointing toward globular cluster M13.
- ★ **December 17th:** Rises into the eastern sky at 3 A.M. through Hercules; ISON at magnitude 3.3; visible until dawn on the 18th.
- ★ **December 20th:** Becomes an evening object, setting at about 6 P.M. at magnitude 3.7.
- ★ **December 24th:** Appears in the west in early evening at mag 4.0; core forms an equilateral triangle with M13 and M92. After Christmas Day, S1 ISON is always above the horizon.
- ★ **January 6th:** Reaches its highest declination, near Polaris, at mag 5.0 before dropping down through Camelopardalis and gradually fading away.

**THE ASTRONOMICAL LEAGUE COMET OBSERVERS CLUB**



As long as you may be looking at comets this year, this might be a good time to consider doing the **Astronomical League's Comet Observing Club** program. See the reward pin at left.

There are two levels: Silver (12 comets) and Gold (18 comets) and some observations as far back as 2001 are acceptable, as long as ALL of the required information is provided. In addition to the usual technical

data on dates and times, observing conditions, and equipment, the program requires a drawing or photographic image of each comet. These don't have to be works of art, just show the comet in sufficient detail (and with nearby objects noted) to prove that you've identified the correct object.

Full details, including submission requirements and an excellent list of Internet resources, are on the Astronomical League Web site, accessible from the home page drop-down menu bar or at:

<http://www.astroleague.org/al/obsclubs/comet/comet.htm>. ★

**RENEW YOUR MEMBERSHIP BY JANUARY 1ST!**

All DAS memberships expire January 1st (unless multiple year payments have been received) and must be renewed to maintain membership benefits. Reminder letters will be sent out in December, but members are encouraged to take advantage of PayPal payments for renewals, Astronomy and Sky & Telescope subscriptions, and donations to the Van Nattan-Hansen Scholarship Fund, Dark Site, and General Fund. If you are an existing member, please use the "Renewal" payment options on

the PayPal store at: [www.denverastro.org/membership.html](http://www.denverastro.org/membership.html) or [www.denverastrosociety.org/membership.html](http://www.denverastrosociety.org/membership.html)

Members who joined in 2012 should use the special PayPal button and the prorated amount specified on the invoice you will receive, which will subtract the renewal cost from the months during 2012 that you were not a DAS member.



# BEGINNERS BITS— FILTERS

by Lisa Judd

Being an astronomer can mean being a gadget fiend, but how do you avoid spending money on what you think you'll need and tailor your equipment to whatever you're going to use the most? A delicious-looking telescope accessory is a filter set, but those who buy them all usually settle into using one or two. Thank goodness for star parties, where you can look through what someone else spent their money on before deciding whether to spend yours. Filters can be colored or chemical-wavelength blockers.

Curiosity about filters often hits when having trouble seeing a dim nebula with given equipment and light-pollution conditions. But, filters don't make it look brighter; when you hear about how a filter "brings out" an object, you're hearing about the filter's ability to dim an object selectively for more contrast, not more brightness (wrong TV knob). To make an object look brighter, you need a bigger mirror - an incurable disease known as "aperture fever" - or darker skies. To be helped by a filter, an object's original view must be bright enough in the first place to afford dimming. High magnification also

makes objects dimmer, so it's tough to observe teeny planetary nebulae with colored filters.

Planets are small and bright even if you jack up the magnification, but you may notice that their own glare gets in the way of seeing details. If you're trying to tease out surface markings on Mars or watch a Red Spot transit on Jupiter, try some color filters. My favorite is a light-yellow (#8 in some esoteric universal filter-labeling system), which dims Jupiter down just enough to watch Io cross its face while keeping the planet's natural color; violet-blue gives hints of atmospheric chemistry near the poles. And if your telescope didn't come with a moon filter, a green works just as well.

Oxygen-III, Hydrogen-Beta and Ultra-High Contrast (UHC) filters are for nebula viewing, and block specific light wavelengths according to spectroscopy of particular chemicals. Each nebula's makeup is different, so particular filters are used for particular objects. But, that's not to say you can't experiment with them - the general rule is that O-III is for the Veil and California nebulae, and many planetary nebulae, while the H-Beta is for the Horsehead. In these

singular examples the filter makes lots of difference, but to get the most out of a buy, try one on the Trifid (or even Mars) to see dark lanes. For general nebular viewing, the UHC filter offers a trade-off for the most enhancement on the largest variety of popular targets.

Light pollution filters are becoming more popular, though most of us still prefer to go to dark sites. They come in wideband and narrowband depending on the type of light pollution (sodium-vapor or bright white), but I've heard that those terms are just another description for O-III and H-Beta; perhaps someone in the club can weigh in? I've just learned about Deep Sky filters from Darrell Dodge, thank goodness! I'd always heard that no filter can do anything for galaxies or clusters, but once I got a look at M13 through his DSF at a public star party, the contrast was amazing! If you have a research grant, you can shop for specialized industrially-made filters for beaucoup bucks.

As with anything I contribute, addenda, questions, comments and corrections are welcome. My email address is [lm\\_judd@hotmail.com](mailto:lm_judd@hotmail.com). ★

## JANUARY SPEAKER: TOSHIYA UETA, PHD, ASSISTANT PROFESSOR, UNIVERSITY OF DENVER



### CIRCUMSTELLAR SHELLS AND THEIR INTERFACES WITH THE INTERSTELLAR MEDIUM.

Dr. Ueta is an assistant professor in the Department of Physics and Astronomy. His research interests include:

- (1) stellar evolution (especially the late stages from the Red Giant to the Planetary Nebula phases involving mass loss processes)
- (2) astropaleontology (investigation into the history of stellar mass loss by observing the circumstellar gas/dust

distribution)

(3) astromineralogy (composition and formation of circumstellar and interstellar dust)

(4) radiative transfer in dusty media

(5) infrared observations of dusty media (composition and formation of circumstellar and interstellar dust)

(6) interactions between stellar winds and the interstellar medium

He is an active user of various space-based and ground-based observatories around the world. Recently, he has been involved in international consortia using the latest infrared telescopes such as Spitzer (US), AKARI (Japan) and Herschel (Europe). ★



Tim Pimentel completed the new installation of clocks at the observatory deck—a nice upgrade to the mostly dead equipment that had been there for some time. DU is grateful to the endless contributions of time and talent that members of the DAS contribute to help keep the observatory viable. —Dr. Bob Stencel, University of Denver.

NASA'S SPACE PLACE

# IT TAKES MORE THAN WARM PORRIDGE TO MAKE A GOLDILOCKS ZONE

A Space Place Partner Article

by Diane K. Fisher

The “Goldilocks Zone” describes the region of a solar system that is just the right distance from the star to make a cozy, comfy home for a life-supporting planet. It is a region that keeps the planet warm enough to have a liquid ocean, but not so warm that the ocean boils off into space. Obviously, Earth orbits the Sun in our solar system’s “Goldilocks Zone.”

But there are other conditions besides temperature that make our part of the solar system comfortable for life. Using infrared data from the Spitzer Space Telescope, along with theoretical models and archival observations, Rebecca Martin, a NASA Sagan Fellow from the University of Colorado in Boulder, and astronomer Mario Livio of the Space Telescope Science Institute in Baltimore, Maryland, have published a new study suggesting that our solar system and our place in it is special in at least one other way.

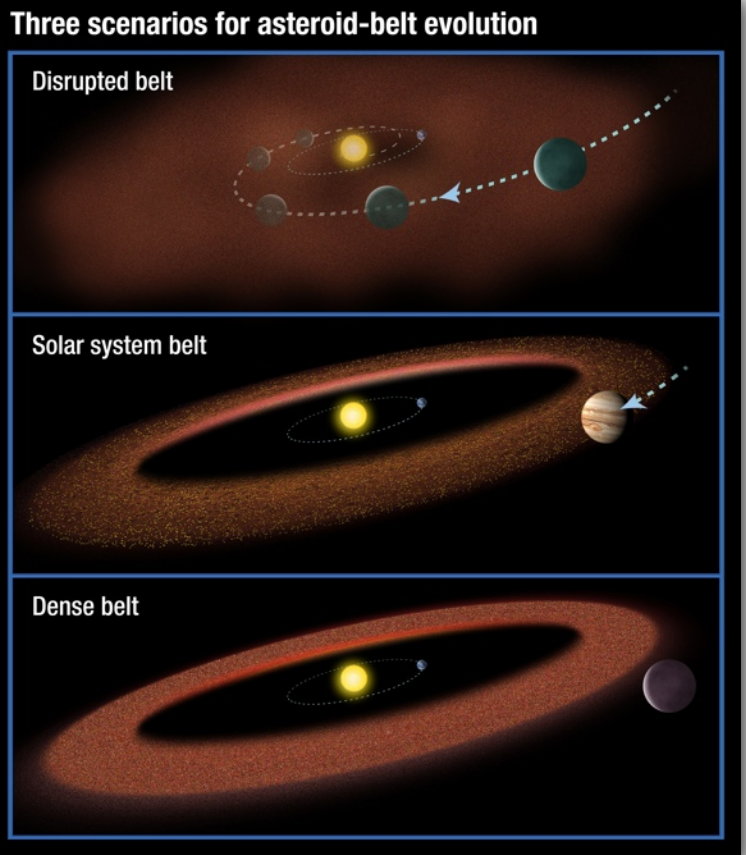
This fortunate “just right” condition involves Jupiter and its effect on the asteroid belt.

Many other solar systems discovered in the past decade have giant gas planets in very tight orbits around their stars. Only 19 out of 520 solar systems studied have Jupiter-like planets in orbits beyond what is known as the “snow line”—the distance from the star at which it is cool enough for water (and ammonia and methane) to condense into ice. Scientists believe our Jupiter formed a bit farther away from the Sun than it is now. Although the giant planet has moved a little closer to the Sun, it is still beyond the snow line.

So why do we care where Jupiter hangs out? Well, the gravity of Jupiter, with its mass of 318 Earths, has a profound effect on everything in its region, including the asteroid belt. The asteroid belt is a region between Mars and Jupiter where millions of mostly rocky objects (some water-bearing) orbit. They range in size from dwarf planet Ceres at more than 600 miles in diameter to grains of dust. In the early solar system, asteroids (along with comets) could have been partly responsible for delivering water to fill the ocean of a young Earth. They could have also brought organic molecules to Earth, from which life eventually evolved.

Jupiter’s gravity keeps the asteroids pretty much in their place in the asteroid belt, and doesn’t let them accrete to form another planet. If Jupiter had moved inward through the asteroid belt toward the Sun, it would have scattered the asteroids in all directions before Earth had time to form. And no asteroid belt means no impacts on Earth, no water delivery, and maybe no life-starting molecules either. Asteroids may have also delivered such useful metals as gold, platinum, and iron to Earth’s crust.

But, if Jupiter had not migrated inward at all since it formed farther away from the Sun, the asteroid belt would be totally undisturbed and would be a lot more dense with asteroids than it is now. In that case, Earth would have been blasted with a lot more asteroid impacts, and life may have never had a chance to take root.



Our solar system is represented by the middle scenario, where the gas giant planet has migrated inward, but still remains beyond the asteroid belt.

The infrared data from the Spitzer Space Telescope contributes in unexpected ways in revealing and supporting new ideas and theories about our universe. Read more about this study and other Spitzer contributions at [spitzer.caltech.edu](http://spitzer.caltech.edu). Kids can learn about infrared light and enjoy solving Spitzer image puzzles at [spaceplace.nasa.gov/spitzer-slyder](http://spaceplace.nasa.gov/spitzer-slyder).

*This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration. ★*

## NOMINATIONS AND ELECTIONS

Nominations of DAS Officers and E-Board members for 2013 occur at the January 25th General Meeting. Tim Pimentel is the Election Chairperson. Contact Tim (Tim Pimentel [tim.pimentel@yahoo.com](mailto:tim.pimentel@yahoo.com)) to make nominations between January and the election held at the Annual (General) Meeting February 22nd. Members must be present at the February Annual Meeting to vote.

## WELCOME DAS NEW MEMBERS!

Tim Graham  
Monserrat Larios  
Jim Pollack

Jeffrey Smith  
Brandon Tilley

*For Cloudy Nights.....*

**Jumble:** Unscramble the letters to form some common brands of equipment, then use the circled letters for the clue below.

R U S S I I

□□□□□□

S T O C A

□□□□□

A M D E E

□□□□□

N V E I X

□□□□□

R O O N I

□□□□□

F I Y F E G

□□□□□□

If you eat junk food to stay up all night observing, you'll wind up with a □□□□□□□□ □□□□□□

Thanks to Lisa Judd for this month's "Jumble" puzzle! Answers will be found in next month's *Observer*.



The Denver Astronomical Society  
c/o Chamberlin Observatory  
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