PRIMEFOCUS

Tri-Valley Stargazers

February 2007

Meeting Info:

What
Dusty Rings in Our Solar System

Who
Dr. Imke de Pater

When
February 16, 2007
Doors open 7:00 p.m.
Lecture at 7:30 p.m.

Where
Unitarian Universalist
Church in Livermore
1893 N. Vasco Road

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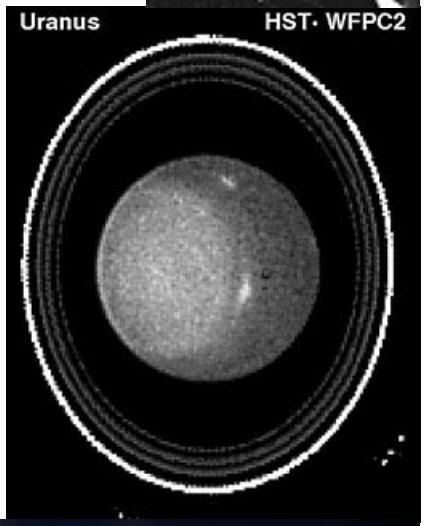
February Meeting

Dusty Rings in Our Solar System:
One Ring Two Ring, Red Ring Blue Ring
Dr. Imke de Pater

The four giant planets are surrounded by ring systems, which all look different and have unique signatures. In addition to cm-to-meters sized 'rocks', all systems reveal dust in various amounts. In fact, Jupiter's ring system is composed primarily of dust. We have observed this dust in all four ring systems with the Keck telescope at infrared wavelengths. Our findings on the uranian ring system are particularly spectacular. Moreover, Uranus will go through equinox in December, and the rings will be 'edge-on' in the summer-winter of 2007. For these reasons I will focus the talk on Uranus, and concentrate on findings from Jupiter's rings and Saturn's dusty outer ring system as they relate to the uranian system. The Uranus observations are obtained using adaptive optics techniques, most of Saturn and Jupiter via conventional infrared observations during ring plane crossing time.



Ring Around the Planets. Top left shows a ring around Jupiter. Upper right are several rings around Neptune. Uranus sports a ring system that, due to Uranus's orientation to the Earth, appear face on to us. Below, the grand daddy of all ring systems, Saturn.

News & Notes

Membership Renewal

If you haven't already done so, please renew your membership this month. This will be the last issue of Prime Focus you'll receive if you don't.

Your membership dues pay for such things as the rental of our meeting space and observing site, insurance for the club (necessary in order to do outreach programs), newsletter printing costs, refreshments, dues for various organizations (like the AANC and the WAA), library purchases, and maintenence of the club's observing site and telescopes.

The membership renewal form can be found on the back of the newsletter, or you can download a PDF version of the form from the Membership link on our web site.

Time is running out, so please send in your membership contributions soon. The club is a non-profit organization, so any donations to the club is tax deductible. If you come to the February meeting, bring your checkbook along and renew your membership at the meeting.

2007 TVS Meeting Dates

The following lists the TVS meeting dates for the next few months. The lecture meetings are on the third Friday of the month, with the Board meetings on the Monday following the lecture meeting. The *Prime Focus* deadline applies to that month's issue (e.g., the February 4th deadline is for the February issue).

Lecture Meeting	**Board Meeting**	***Prime Focus* Deadline**
Feb. 16	Feb. 19	Feb. 4
Mar. 16	Mar. 19	Mar. 4
Apr. 20	Apr. 23	Apr. 8

Money Matters

Treasurer **David Feindel** reports the TVS account balances (as of January 22, 2007):

Checking	$3,174.82	
CD #1	$3,580.37	matures 02/17/07
CD #2	$2,530.80	matures 02/27/07

RASC Handbooks

We only have a couple RASC (Royal Astronomical Society of Canada) 2007 Observer's Handbooks and Calendars for sale. If you're interested in either one, they will be available for purchase at the February meeting. The Handbook is $20, the Calendar is $12.

The Handbook is filled with all kinds of astronomical data, like Optics and Observing, Table of Double and Multiple Stars, a monthly listing of sky events, and the Pluto Finder Chart. The calendar was created by the RASC and features photos taken by amateur astronomers.

Large Donation to TVS

The club would like to thank **Herb Quick** for the generous donation of his observatory dome and the 16" Meade scope that is housed inside of it, as well as assorted eyepieces and filters.

If you've been to the club's dark sky site, H2O, then you've seen Herb's white Home-Dome not far from our roll-off roof observatory.

The club will be making some repairs to the dome, as it recently sustained some damage when the dome diameter expanded enough to cause it to collapse down ontop of the walls. Fortunately, the scope inside missed being hit by the dome. We're not sure how the observatory sustained the damage—it's thought the high winds we had about a month ago played a part.

Comet McNaught as seen from the Bay Area in January. The comet was bright enough to be seen during daylight. Alas, it set shortly after sunset, so we Northern Hemispere folks didn't get to see the spectacular show it put on for those in the Southern Hemisphere.
Photos by: Gert Gottschalk (immediate right), and Conrad Jung.

Newsletter header image: The Orion Nebula M42 / NGC1976

The Orion Nebula is a star forming region about 1,500 light years from Earth. The image is of an area southwest of the Trapezium group of stars in the nebula. The bright star in the lower left is LP Orionis. It is surrounded by a reflection nebula. The star is moving within material that lies in front of M42. The bright rim above it indicates that the dark region around the star must be a cavity formed as the star moves through the material.

Photo: NASA, ESA, M. Robberto (Space Telescope Science Institute/ ESA), and the Hubble Space Telescope Orion Treasury Project Team

Calendar of Events

February 10, 3:30 and 5:30 p.m.
February 11, 1:30 and 3:30 p.m.

What: *Love Mission to Mars!*
Who: You & a loved one
Where: Chabot Space & Science Center, Oakland
Cost: $75 per couple. RSVP to 510-336-7311 or email groupsales@chabotspace.org

Take your sweetheart on a Valentine's date that's out of this world! Take off on Chabot's original romantic adventure flight, Love Mission to Mars!

Includes: 1 hour space mission, general admission to Chabot, and one planetarium show for 2.

Chocolates, beverages and a souvenir will be available before the mission.

Participants must arrive at least 15 minutes prior to mission. Love flights depart on time; no late arrivals will be accepted!

February 20, 7:30 p.m.

What: *Stardust: First Samples from the Kuiper Belt and from Interstellar Space*
Who: Dr. Andrew Westphal (UC Berkeley)
Where: Jewish Community Center, San Francisco
Cost: $4.00 at the door or by mail

In 2006, Stardust returned the first solid sample return since the 1970's, and the first ever from beyond the Moon. This talk will summarize preliminary results of the cometary sample, and give an update on the search for contemporary interstellar dust in the interstellar dust collector, using >15,000 highly sophisticated image processors—human eyes and brains.

All programs begin at 7:30 pm in Kanbar Hall at the Jewish Community Center of San Francisco, 3200 California Street. Parking is available across the street in the UCSF Laurel Heights campus parking lot for $1.25 per night. Parking in the JCC garage is $1.25 per half-hour. For more information, call 415-321-8000.

March 7, 7:00 p.m.

What: *Searching for Earth-like Planets: NASA's Kepler Mission*
Who: Janice Voss (NASA Ames Research Center)
Where: Smithwick Theater, Foothill College
Cost: Free, but parking is $2 in quarters

The more than 200 planets discovered around other stars so far are all Jupiter-like planets, big and most likely made of gases and liquids. Naturally, astronomers are eager to refine their search to be able to identify smaller solid planets, resembling our own Earth. In November 2008, NASA is scheduled to launch the Kepler mission, to search for Earth-like planets around distant stars. Dr. Voss, who is the Science Office Director for the project, will describe the design and expected results from the four-year mission.

Dr. Voss has advanced degrees in electrical engineering and aeronautics/astronautics, and has also done research in space physics. She became an astronaut in 1991, and has been a mission specialist on five space flights. She has logged over 49 days in space, traveling 18.8 million miles.

As part of the evening, she will also discuss her experiences as a scientist in space and her perspective on the space program. She will take questions from the audience at the end of the talk. Call the series hot-line at 650-949-7888 for more information and driving directions.

What's Up *by Debbie Dyke*

All times Pacific Standard Time.

February

7	Wed	Moon at apogee (251,095 miles). 5:00 a.m. Mercury at greatest elongation east (18°). 9:00 a.m. Venus 0.75° south of Uranus low in the western sky. 7:00 p.m.
8	Thur	Neptune in conjunction with the Sun. 8:00 a.m. 1677 Jacques Cassini born.
10	Sat	Mercury at perihelion. **Last Quarter Moon**. 1:51 a.m. Saturn at opposition, approximately 762,600,000 miles from Earth. 11:00 a.m.
12	Mon	1809 Charles Darwin born.
13	Tue	1852 Johann Dreyer, compiler of the NGC catalogue, born.
14	Wed	Valentine's Day.
15	Thur	1564 Galileo Galilei born.
16	Fri	1948 Gerard Kuiper discovers Miranda, a moon of Uranus. **Tri-Valley Stargazers general meeting**. 7:30 p.m. at the Unitarian Universalist Church, 1893 N. Vasco Road, Livermore.
17	Sat	**New Moon**. 8:14 a.m.
18	Sun	1930 Clyde Tombaugh discovers Pluto using the 13-inch scope at Lowell Observatory. **Tri-Valley Stargazers discussion meeting**. 2:00 p.m. at the Round Table Pizza on 1024 E. Stanley Blvd., Livermore. Discuss astro stuff with your fellow members.
19	Mon	**Tri-Valley Stargazers Board meeting**. 7:00 p.m. at the Round Table Pizza in Livermore. Moon just 5.5° from Venus in the west right after sunset. Mercury is very low on the horizon. Moon at perigee (224,090 miles). 2:00 a.m. 1473 Nicolaus Copernicus born.
20	Tue	Mercury at grestest heliocentric latitude north. 1962 John Glenn becomes the first American in orbit.
22	Thur	Mercury in inferior conjunction. 9:00 p.m.
23	Fri	**First Quarter Moon**. 11:56 p.m.
28	Wed	Moon 2.5° north of the Beehive Cluster (M44). 8:00 p.m.

March

3	Sat	**Full Moon**. 3:17 p.m
5	Mon	Uranus in conjuntion with the Sun. 8:00 a.m. Mercury at greatest heliocentric latitude north. 1979 Voyager 1 flies plast Jupiter and captures first detailed images of it, its rings and moons.
6	Tue	For the next two weeks, the Zodiacal light will in in view look towards the west after evening twilight. Moon at apogee (251,628 miles). 8:00 p.m. 1986 Vega 1 spacecraft encounters Comet Halley.
7	Wed	Mercury stationary. 2:00 a.m. 1792 John Herschel born.
10	Sat	1977 James Elliot discovers the rings of Uranus.
11	Sun	**Daylight Saving Time begins**. 2:00 a.m. **Last Quarter Moon**. 7:54 p.m.

A Great Big Wreck

by Dr. Tony Phillips

People worry about asteroids. Being hit by a space rock can really ruin your day. But that's nothing. How would you like to be hit by a whole galaxy?

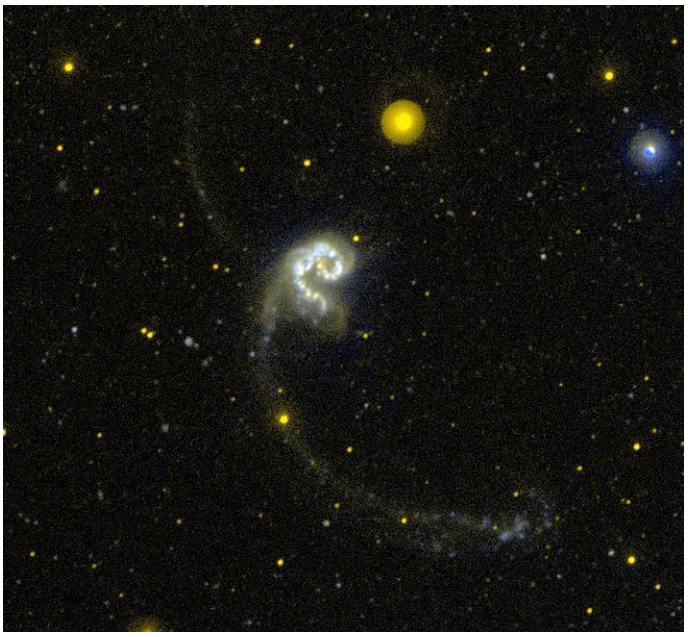
It could happen. Astronomers have long known that the Andromeda Galaxy is on a collision course with the Milky Way. In about 3 billion years, the two great star systems will crash together. Earth will be in the middle of the biggest wreck in our part of the Universe.

Astronomer John Hibbard isn't worried. "Galaxy collisions aren't so bad," he says. A typical spiral galaxy contains a hundred billion stars, yet when two such behemoths run into each other "very few stars collide. The stars are like pinpricks with lots of space between them. The chance of a direct hit, star vs. star, is very low."

Hibbard knows because he studies colliding galaxies, particularly a nearby pair called the Antennae. "The two galaxies of the Antennae system are about the same size and type as Andromeda and the Milky Way." He believes that the Antennae are giving us a preview of what's going to happen to our own galaxy.

The Antennae get their name from two vast streamers of stars that resemble the feelers on top of an insect's head. These streamers, called "tidal tails," are created by gravitational forces—one galaxy pulling stars from the other. The tails appear to be scenes of incredible violence.

But looks can be deceiving: "Actually, the tails are quiet places," says Hibbard. "They're the peaceful suburbs of the Antennae." He came to this conclusion using data from GALEX, an ultraviolet space telescope launched by NASA in 2003.



This GALEX UV image of the colliding Antennae Galaxies shows areas of active star formation, which is not in the tidal tails as one might expect.

The true violence of colliding galaxies is star formation. While individual stars rarely collide, vast interstellar clouds of gas do smash together. These clouds collapse. Gravity pulls the infalling gas into denser knots until, finally, new stars are born. Young stars are difficult to be around. They emit intensely unpleasant radiation and tend to "go supernova."

GALEX can pinpoint hot young stars by the UV radiation they emit and, in combination with other data, measure the rate of star birth. "Surprisingly," Hibbard says, "star formation rates are low in the tidal tails, several times lower than what we experience here in the Milky Way." The merging cores of the Antennae, on the other hand, are sizzling with new stars, ready to explode.

So what should you do when your galaxy collides? A tip from GALEX: head for the tails.

To see more GALEX images, visit www.galex.caltech.edu. Kids can read about galaxies and how a telescope can be a time machine at spaceplace.nasa.gov/en/educators/galex_puzzles.pdf.

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

Astro Events

The is the brightest part of the Virgo cluster of galaxies, called Markarian's Chain (named for Armienian astronomer Benik Markarian). The bright elliptical galaxies at the bottom of the chain are M86 (left) & M84 (right).

In the image, there are at least nine galaxies visible. The Virgo cluster itself contains around 2,000 galaxies. The cluster is about 70 million light years away. *Photo: Conrad Jung*

Tri-Valley Stargazers
P.O. Box 2476
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PRIMEFOCUS

Tri-Valley Stargazers Membership Application

Member agrees to hold Tri-Valley Stargazers, and any cooperating organizations or landowners, harmless from all claims of liability for any injury or loss sustained at a TVS function.

Name _____ Phone _____ e-mail _____

Address _____

Do not release my: _____ address, _____ phone, or _____ e-mail information to other TVS members.

Membership category: _____ $5 Student.
_____ $30 Basic. You will receive e-mail notification when the PDF version of *Prime Focus* is available for download off the TVS web site.
_____ $40 Regular. You will receive a paper version of *Prime Focus* in the mail.
_____ $32.95 One year subscription to *Sky & Telescope* magazine.
_____ $34 One year subscription to *Astronomy* magazine.
_____ $60 Two year subscription to *Astronomy* magazine.
_____ $10 Hidden Hill Observatory (H2O) yearly access fee. You need to be a key holder to access the site.
_____ $20 H2O key holder fee. (A refundable key *deposit*—key property of TVS).
_____ $40 Patron Membership. Must be a member for at least a year and a key holder.
$_____ Tax deductible contribution to Tri-Valley Stargazers.

$_____ TOTAL – Return to: Tri-Valley Stargazers, P.O. Box 2476, Livermore, CA 94551

Membership information: Term is one calendar year, January through December. Student members must be less than 18 years old or still in high school.