

SJAA EPHEMERIS

Astronaut Russell Schweikart Has a Plan for the Big One

Astronaut Russell Schweikart was the speaker as the Silicon Valley Astronomy Lecture Series opened for the 2004-2005 year. As always, Andrew Fraknoi, the astronomy teacher at Foothill College welcomed the crowd to the lecture. Fears that the number of people would exceed the seating availability were unfounded but the free lecture on October 6th was well attended. Parking was a bit tricky because of the changes made to the lower level parking lots (Hint: take the

Gagarin route – make a nearly complete orbit around the campus and turn into Parking Lot 7 – the lot is mostly empty, the exercise up the hill is good for you and the remodeled lot has parking voucher machines that take dollar bills.)

Russell (Rusty) Schweikart is the chairman of the board of the B612 Foundation. This is an organization trying to raise awareness of the problems posed by near earth asteroids and the methods for alleviating those problems.

The big problem is that there are so many near earth asteroids, perhaps upwards from 200,000, that cross the earth's orbit or come close to it. These are asteroids that are at least 100 meters long. An asteroid of this size would have the same impact as two of the largest thermonuclear warheads ever developed. The immediate devastation plus the nuclear winter to follow could kill millions. Smaller impacts, say something on the order of the Tunguska event, is not of immediate concern but obviously such an event directly on a populated area would be enormous.

SJAA Activities Calendar

Jim Van Nuland

November

- 5** Hoge Park star party. Sunset 5:05 p.m., 39% moon rise 0:12 a.m. Star party hours: 7:00 to 10:00 p.m.
- 5** Astronomy class at Hoge Park. 7:30 p.m.
- 6** Deep sky weekend. Sunset 5:04 p.m., 30% moon rise 1:14 a.m.
- 11** ATM class at Hoge Park. 7:30 p.m.
- 13** Deep sky weekend. Sunset 4:59 p.m., 1% moon sets 5:48 p.m.
- 19** Hoge Park star party. Sunset 4:55 p.m., 62% moon sets 0:37 a.m. Star party hours: 7:00 to 10:00 p.m.
- 20** **General meeting.** Don Machholz will tell of his newest discovery, comet 2004Q2 (Machholz). His 10th! 8 p.m.
- 21** Fall swap at Hoge Park. From Noon onward.
- 27** ATM Class at Hoge Park. 7:30 p.m.

December

- 3** Hoge Park star party. Sunset 4:50 p.m., 66% moon rise 11:01 p.m. Star party hours: 7:00 p.m. to 10:00 p.m.
- 3** Astronomy class at Hoge Park. 7:30 p.m.
- 4** Deep sky weekend. Sunset 4:50 p.m., 47% moon rise 0:02 a.m.
- 9** ATM Class at Hoge Park. 7:30 p.m.
- 11** Deep sky weekend. Sunset 4:51 p.m., 0% moon
- 17** Hoge Park star party. Sunset 4:52 p.m., 36% moon sets 11:35 p.m. Star party hours: 7:00 p.m. to 10:00 p.m.
- 18** **General meeting.** SJAA 50th Anniversary Celebration and Holiday Party. 8 p.m.
- 23** ATM Class at Hoge Park. 7:30 p.m.

The Board of Directors meets at 6:30 p.m. preceding each general meeting. All are welcome.

The audience gasped when Schweikart displayed a plot that showed how many known asteroids intersect the earth's orbit. Many of these objects have only been seen for part of one orbit so their exact location data is preliminary at best. The B612 Foundation web site says we will have a 90% inventory of 1 km sized objects by 2008 and perhaps the same for 100 m objects 10 years after that.

Despite all of this, the odds of a major event in the next 100 years is very low. But we all know that it will happen some time. And we all know that if we don't kill ourselves first, an asteroid will do unto us what it apparently did unto the dinosaurs 65 million years ago. So the B612 Foundation (B612 is the asteroid from Antoine de Saint Exupery's *The Little Prince*) wants to develop a solution that could be demonstrated to be effective by the year 2015. A "safe" asteroid that comes close to earth would be used to demonstrate the capability. After that, it isn't necessary to keep a fleet of rockets ready

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24 hour news and information hotline: (408) 559-1221

<http://www.sjaa.net>

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to fire – just don't loose the plans.

Here is the scenario that Schweikart presented. Imagine that a 100 meter asteroid is found with an orbit that is going to lead to an earth impact in 10 to 20 years. Most of these asteroids have rather elliptical orbits. A rocket would be attached to the asteroid (details on how to do that are to be determined) which would push the asteroid into a slightly larger orbit. How? First, you have to understand the kind of rocket envisioned. It turns out that the Jupiter Icy Moons Orbiter, an ion engine powered spacecraft, fills the bill. The thrust is shy of 10 pounds but it can run for a very long time. Second, the rocket would be attached as it came near the earth and would start firing near perihelion. In this scenario, the rocket pushes the asteroid forward starting about 100 days before perihelion and continues for 200 days. The result is that the asteroid shows up late for its date.

So if the problem is so clear and the solution conceptually designed, what's the problem? Mostly, funding is needed. The ion engine rocket, also known as the Prometheus project, has not added asteroid management to its to-do list. Letters to NASA or your congressperson are suggested.

One of the most interesting points that Schweikart made that night was why we don't want to use nuclear weapons to blow up an asteroid. More important than the fact that we don't know how an asteroid will react (a look at the craters on the asteroids demonstrates that they don't disintegrate easily) is that we don't want to keep nuclear weapons around forever just in the off chance that an asteroid heads this way. After all, it is nuclear weapons that could wipe us out before an asteroid ever gets a chance.

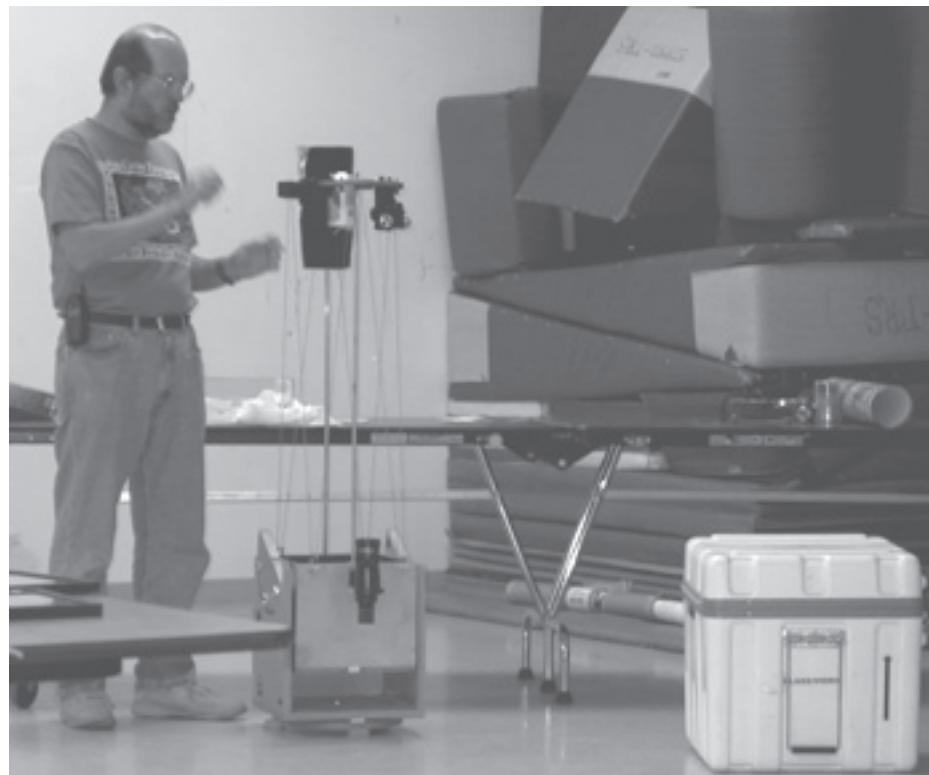
The B612 Foundation has an interesting website at <http://www.b612foundation.org>.

Slide and Equipment Night

September 25, 2004



That small box on the floor is a complete string Dobsonian telescope, to the amazement of some and the delight of its creator, Craig Colvin. Rich Neuschaefer admires the fine craftsmanship.



Rob Hawley demonstrates his string Dobsonian which he successfully used on his trip to Costa Rica. Both string Dobs are 8" f/6 and based on a design by Charles Wickes. Photos courtesy of Mary Kohlmiller.

Getting It Right The Second Time?

Dave North

Let's lead with two corrections.

How about that eclipse? Oops!

I didn't send in my column last month so I shirked my duty to make sure you all knew about it. Travel plans messed me all up and I didn't realize it until too late. But hopefully you got the news anyway.

My other mistake was blathering mindlessly about the neap tides taking place when the Moon is in opposition, which is completely wrong. The neap (lowest high) tides take place when the Sun and Moon are aligned at right angles to the earth, contributing nothing to each other's pull. I have no excuse for this blunder – I've known that since at least high school. I should read what I write sometimes.

This was brought to my attention by Bill Maney, who also took me to task for not mentioning the centripetal force component of the tides. While that is a factor, it's not really the main factor (and there are others, such as internal friction and the friction of water on land, etc.). I'll beg off on this one by pointing out that Cornell doesn't mention the effects of centripetal force either (though NOAA has quite a nice section on it).

Nevertheless, it's interesting. Since the Earth/Moon system is spinning around its barycenter (located inside the Earth) there's a tendency for anything 'loose' (such as water) to seem to move away from that center of rotation. Of course, there's also some distortion of the Earth and Moon as well, but it's quite small.

This is complicated by the two conflicting periods involved: the system itself spins about once every four weeks, but the Earth is spinning 'through the spin' in just under a day. The result is an effective 'push' of the water away from

the Moon. However, it appears this effect is fairly weak compared to the effect of differential gravity (no, I haven't personally run the numbers, which shouldn't be all that hard. I'm just taking other folks' word for it, which isn't Best Practice. But I'm lazy – you should know that by now).

I suspect the centripetal effect is a bit more

intuitive when trying to explain why, well, there's a water bulge on the side of the Earth opposite the Moon. How can gravity from the Moon (which attracts, mind you) cause water to bulge away from it? That just seems silly.

The problem is remembering that tides are caused by force gradients, not by the force itself. The water on the side of the Earth closest the Moon is about 8,000 miles closer to the Moon than the water on the opposite side. Since the Moon is roughly 240,000 miles away, that's about 1/30 of the radius. A fair percentage! So there's less gravitational attraction on the far water – even less than the water on the limbs as viewed from the Moon.

So from the Moon's point of view, that water is lighter. Weighs less, so to speak. Up it goes!

Okay, that's not the classical way of putting it. The 'textbook' description is that the Earth is being pulled away more than the water on the side furthest from the Moon. And since the Earth is (relatively) rigid and water is not, the Earth is 'lifted away' from the distal water!

Somehow I'm not sure I'm making this any easier to understand. I hope so, though.

Now for the part that was entirely new to me, even after all these years. In discussion with some friends up near Jackson one Saturday night, the question was posed "why is the Moon receding from Earth" (why is the distance increasing?)

The problem is remembering that tides are caused by force gradients, not by the force itself.

This troubled me; I had no immediate answer. I already knew tidal stress was slowing down the rate of Earth's spin. But if something similar were happening to the Moon, one would think it would lead to a decaying orbit, where the Moon would be getting closer rather than further away.

But no!

Remember the friction of water on land? Turns out that's very important to this issue. The relatively rapid rotation of Earth 'pulls' the tidal bulge slightly ahead of the Moon in its orbital path. It's kind of like a huge torque converter.

Those leading bulges pull on the Moon, dragging it into a faster orbit slowly but surely. Greater velocity = higher orbit. Aha!

Of course, this process will slow down and end when the Earth/Moon system is completely tidally locked. And as usual, there are other members of the club who understand these issues far better than me, and I'd love to hear about it!

Stay tuned for next month's corrections to this month's column.

Perhaps if I ever get one entirely right, I should immediately stop.

The Shallow Sky

The planetary show in November is mostly in the morning sky.

Akkana Peck

Jupiter and Venus share the dawn, rising nearly four hours before sunrise. They have a close pass (roughly half a degree apart) on November 4th. Check out the sight in a low-power eyepiece: brilliant Venus, magnitude -4 and showing a small gibbous disk, and bigger but fainter Jupiter, with all its bands and moons. This should be a very nice conjunction for the early riser with any level of observing equipment, from the naked eye to a large telescope. For the telescopic observer, Io's shadow begins a pass at about 5:30 am that morning.

Meanwhile, Mars creeps up out of

morning twilight, gaining height as the month progresses. It's fairly small, so it will be a struggle to see much detail when it's so low in the sky.

The evening belongs to the outer planets. Uranus and Neptune are low in the western sky at sunset, setting before midnight; but meanwhile, by around 10 p.m., Saturn has risen.

Pluto, alas, is too close to the sun to be seen this month, but observers who want a glimpse of something small can check out Mercury, very low in the evening twilight during the latter half of the month.



This 22-second exposure of Saturn's equator was taken on September 12, 2004. The white area in the upper right is actually the rings of Saturn but deliberately overexposed. Photo Courtesy NASA/JPL-Caltech.

Panel Discussion at Independence High School – November 3

Mingling Planetary Microbes

Suzanne Chippindale

In the past year, two spacecraft landed on Mars to explore its surface. Early next year, another will descend to the surface of Saturn's moon, Titan. In years to come, more missions will follow, and some will carry humans. As we expand our presence on other planets, we must consider what we might bring with us that could threaten their ecosystems. And recently, a spacecraft containing solar wind samples crashed on Earth. Eventually, when we bring more samples—or astronauts—back to Earth, what dangers could they pose to our own planet?

The Planetary Society Bay Area Volunteer Network presents

MINGLING PLANETARY MICROBES:

Protecting Alien Ecosystems... and Our Own

SPEAKERS:

- Margaret S. Race — Ecologist, Planetary Protection; SETI Institute and NASA
- Christopher P. McKay — Planetary scientist, Space Science; NASA/Ames Research Center
- Sandra M. Dawson — Risk Communication; NASA/Jet Propulsion Laboratory

Wednesday, November 3, 2004, 7:00 p.m.

Independence High School — C Villa

1776 Educational Park Drive, San Jose, CA 95112

Driving directions: <http://ih.esuhsd.org/AreaMap.htm>

Campus Map: <http://ih.esuhsd.org/campusmap.htm> We will be in "C Villa".

TICKETS:

Advance orders by mail: \$2.00. (At the door: \$5.00)

* Admission is free with purchase of a new membership in The Planetary Society *
For an online printable order form, please visit <http://tpsbavn.org/MinglingMicrobes.htm>

Fall Swap Meet

Mike Koop

The SJAA Fall Astronomical swap meet will be conducted at Houge Park in San Jose Sunday November 21, 2004, starting at noon.

Telescopes, eyepieces, mountings, mirrors, lenses, clock drives, books, camera equipment, star charts, finders, tubes, diagonals, photographs, space art — everything you need to make your hobby more enjoyable. You name it, it's likely to be there. Check your garage and closets for anything astronomical you would like to sell. Anyone can buy and sell, it's fun and easy!

This is the fourth year for the swap, which is a follow on to the spring auction that has been run for twenty-four years. There is no auction, just the swap sale. Get your holiday shopping done early this year!

Doors open at 12:00 p.m. to set up tables and bring in material for sale. Selling will begin at 1 p.m., and will run as long as needed (probably 3 p.m.). Each buyer pays the seller. Sellers are to keep track of their sales and pay 10% commission for items (new or used) with a cap of \$50 for any one item,

Directions to Houge Park

Houge (rhymes with "Yogi") Park is in San Jose, near Campbell and Los Gatos. From Hwy. 17, take the Camden Avenue exit. Go east 0.4 miles, and turn right at the light, onto Bascom Avenue. At the next light, turn left onto Woodard Road. At the first stop sign, turn right onto Twilight Drive. Go three blocks, cross Sunrise Drive, then turn left into the park.

From Hwy. 85, take the Bascom Avenue exit. Go north, and turn right at the first traffic light, onto White Oaks Road. At the first stop sign, turn left onto Twilight Drive. You will now be passing the park. Turn right at the first driveway, into the parking lot.

\$500 maximum per seller. The commission is fully tax deductible. There are no table fees. Please bring items that would interest the astronomical audience such as astronomical, science, or tech items. The SJAA reserves the right to turn away inappropriate items for the swap.

Do you have a large item to sell such as a telescope? Please email swap@sjaa.net with a description and a photo of the item or a link to your own website for some pre-swap publicity. Do you have only one item to sell, such as a book or eyepiece? A consignment table for people to drop off up to 3 items will be available so that they can shop at the swap and not be hindered by selling an item.

For more information and directions, visit our web site at <http://www.sjaa.net>.

Ed. Note – URLs listed in articles are most accurate and most useful in the HTML version of this newsletter. See <http://ephemeris.sjaa.net>.

General Meeting Speaker

Don Machholz to Discuss His Latest Comet Discovery

Bob Havner

Early in the morning on August 27, 2004, from his home in Colfax, Ca., Don Machholz discovered his 10th comet. Don has been looking for and discovering comets for almost 30 years. Since January 1, 1975 he has logged over 7000 hours observing time looking for the elusive objects. Don will be speaking at the November 20th SJAA meeting about comet hunting and his latest discovery, Comet Machholz (Comet 2004 Q2).

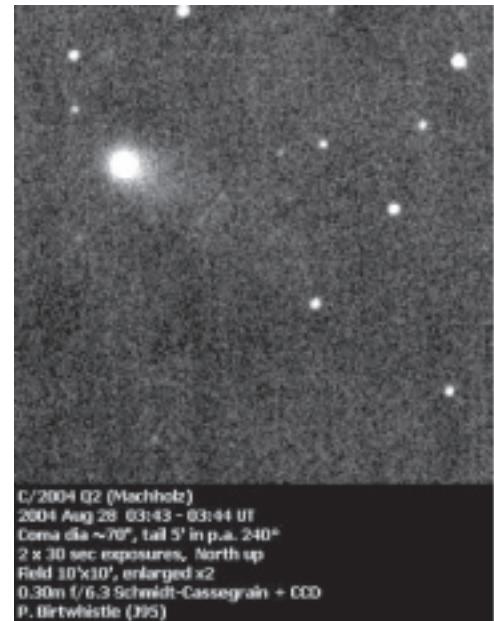
Read about Don's discovery of Comet 2004 Q2 (Machholz) at <http://ephemeris.sjaa.net/0410/b.html>

The 2005 RASC Observer Handbooks and Calendars are here!

Gary Mitchell

We just received our order for the RASC (Royal Astronomical Society of Canada) Observer Handbooks and astronomy calendars for 2005. They'll be available at SJAA meetings and at the SJAA swap meet for as long as the supply lasts. (If you can't make it to the meetings or swap and would be willing to cover the mailing costs, contact the club Treasurer to arrange a purchase.)

There is one little fly-in-the-ointment... their prices have gone up. SJAA will be absorbing the increase on the calendars--still \$10 (retail is \$13.95). However, SJAA's margin on the books is so thin, we cannot sell them for \$15 any longer. The new price will be \$17. However, that's still WAY below the retail price of \$23.95.



The official portrait of Comet Machholz.

Eliot Quataert Discusses Black Holes on November 10, 2004 at 7 p.m.

Andrew Fraknoi

Astronomer Eliot Quataert of U.C. Berkeley will give a non-technical, illustrated talk on: "Black Holes: The Science Behind the Science Fiction."

Dr. Quataert will begin by describing what black holes are (and what they are not!). He will then discuss how black holes are discovered and how they give rise to some of the most remarkable and bizarre phenomena in the universe.

Dr. Quataert is a professor in the Astronomy Department at UC Berkeley

where he is a highly regarded teacher and public lecturer. He is one of the leading scientists studying how black holes are formed, the effects of black holes on their surroundings, and how black holes reveal themselves when hot gas from the neighborhood falls into them. He has received a number of national awards for young scientists including the Alfred P. Sloan Fellowship and the Packard Fellowship for Science and Engineering.

No background in science will be

required for this talk, which will interest everyone with a love of the frontier between science and science fiction.

Free and open to the public. Parking on campus costs \$2. Call the series hot-line at 650-949-7888 for more information.

Co-sponsored by:

* NASA Ames Research Center

* The Foothill College Astronomy Program

* The SETI Institute

* The Astronomical Society of the Pacific

Solar System Stats for November 2004

Adapted from the Observer's Handbook published by The Royal Astronomical Society of Canada which in turns gets this data from the U.S. Naval Observatory's Nautical Almanac Office and Her Majesty's Nautical Almanac Office and contributions by David Lane, St. Mary's University, Halifax NS.

		Mercury	Venus	Mars	Jupiter	Saturn	Uranus	Neptune	Sun
RA	1	15 ^h 28 ^m	12 ^h 15 ^m	13 ^h 27 ^m	12 ^h 30 ^m	7 ^h 57 ^m	22 ^h 20 ^m	21 ^h 00 ^m	14 ^h 26 ^m
	11	16 ^h 27 ^m	13 ^h 01 ^m	13 ^h 52 ^m	12 ^h 37 ^m	7 ^h 57 ^m	22 ^h 20 ^m	21 ^h 00 ^m	15 ^h 06 ^m
	21	17 ^h 20 ^m	13 ^h 47 ^m	14 ^h 17 ^m	12 ^h 44 ^m	7 ^h 57 ^m	22 ^h 20 ^m	21 ^h 01 ^m	15 ^h 47 ^m
Dec.	1	-20°32'	+0°03'	-8°22'	-2°01'	+20°36'	-11°11'	-17°07'	-14°27'
	11	-24°09'	-4°34'	-10°49'	-2°46'	+20°36'	-11°12'	-17°06'	-17°26'
	21	-25°40'	-9°05'	-13°10'	-3°28'	+20°39'	-11°11'	-17°04'	-19°56'
Dist (AU)	1	1.33	1.24	2.56	6.27	8.80	19.63	29.99	0.992
	11	1.20	1.30	2.53	6.18	8.64	19.79	30.16	0.990
	21	1.02	1.36	2.48	6.07	8.49	19.96	30.33	0.988
Mag	1	-0.4	-4.0	1.7	-1.7	0.1	5.8	7.9	
	11	-0.3	-4.0	1.7	-1.8	0.1	5.8	7.9	
	21	-0.3	-4.0	1.7	-1.8	0.0	5.8	7.9	
Size	1	5.1"	13.4"	3.6"	31.4"	18.8"	3.6"	2.2"	32'14"
	11	5.6"	12.8"	3.7"	31.9"	19.1"	3.5"	2.2"	32'19"
	21	6.6"	12.3"	3.8"	32.4"	19.5"	3.5"	2.2"	32'23"

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Publication Statement

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San Jose, CA 95159-8243

Submit

Submit articles for publication in the SJAA Ephemeris. Send articles to the editors via e-mail to ephemeris@sjaa.net. **Deadline, 10th of previous month.**

SJAA loaner scope status

All scopes are available to any SJAA member; contact Mike Koop by email (koopm@best.com) or by phone at work (408) 473-6315 or home (408) 446-0310 (Please leave message, phone screened).

Available scopes

These are scopes that are available for immediate loan, stored at other SJAA members homes. If you are interested in borrowing one of these scopes, please contact Mike Koop for a scope pick up at any of the listed SJAA events.

# Scope	Description	Stored by
1	4.5" Newt/ P Mount	Annette Reyes
3	4" Quantum S/C	Hsin I. Huang
7	12.5" Dobson	Tom Fredrickson
11	Orion XT6 Dob	Lia Klofas
14	8" f/8.5 Dob	Colm McGinley
16	Solar Scope	Bob Havner
19	6" Newt/P Mount	Daryn Baker
23	6" Newt/P Mount	Wei Cheng
24	60mm Refractor	Al Kestler
27	13" Dobson	Steve Houlihan
32	6" f/7 Dobson	Sandy Mohan
34	Dynamax 8" S/C	Yuan-Tung Chin
38	Meade 4.5" Digital Newt	Tej Kohli

Scope loans

These are scopes that have been recently loaned out. If you are interested in borrowing one of these scopes, you will be placed on the waiting list until the scope becomes available after the due date.

# Scope	Description	Borrower	Due Date
6	8" Celestron S/C	Karthik Ramamurthy	1/8/2005
12	Orion XT8 Dob	Terry Rowe	12/8/04
29	C8, Astrophotography	Mark Ziebarth	12/10/04
37	4" Fluorite Refractor	Steve Sergeant	1/6/2005
39	17" Dobson	Rob Hawley	11/28/04

Extended scope loans

These are scopes that have had their loan period extended. If you are interested in borrowing one of these scopes, we will contact the current borrower and try to work out a reasonable transfer time for both parties.

# Scope	Description	Borrower	Due Date
2	6" f/9 Dob	John Paul De Silva	?
8	14" Dobson	Jan Lynch	1/9/05
9	C-11 Computar	Bill Maney	Indefinite
10	Star Spectroscope	Bill O'Shaughnessy	1/11/05
13	Orion XT6 Dob	Eric Anderson	12/7/04
15	8" Dobson	Scott Pelger	1/5/05
21	10" Dobson	Michael Dajewski	Repair
26	11" Dobson	Vivek Kumar	1/10/05
28	13" Dobson	Anupam Dalal	11/1/04
33	10" Deep Space Explorer	Jason Yoon	1/15/2005
35	Meade 8" Equatorial	Peter Young	11/28/04
36	Celestron 8" f/6 Skyhopper	Dennis Hong	1/8/05
40	Super C8+	Mike Macedo	12/11/04
41	18" Sky Designs Dob	Len Bradley	1/12/05
42	11x80 Binoculars	Ritesh Vishwakarma	1/10/05

Waiting list:

8	14" Dobson	Jim Song
10	Star Spectroscope	Jim Albers
33	10" Deep Space Explorer	Ian Coman

San Jose Astronomical Association Membership Form

New **Renewal** (Name only, plus corrections below)

Membership Type:

Regular — \$15

Regular with Sky & Telescope — \$48

Junior (under 18) — \$6

Junior with Sky & Telescope — \$39

Bring this form to any SJAA Meeting
or send (with your check) to

**San Jose Astronomical Association
P.O. Box 28243
San Jose, CA 95159-8243**

Subscribing to Sky & Telescope magazine through the SJAA saves you \$10 off the regular rate. (S&T will not accept multi-year subscriptions through the club program. Allow 2 months lead time.)

Make your check payable to "SJAA"
(not Sky Publishing)

Name: _____

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