University Lowbrow Astronomers
Ann Arbor, Michigan

# REFLECTIONS REFRACTIONS

## of the University Lowbrow Astronomers

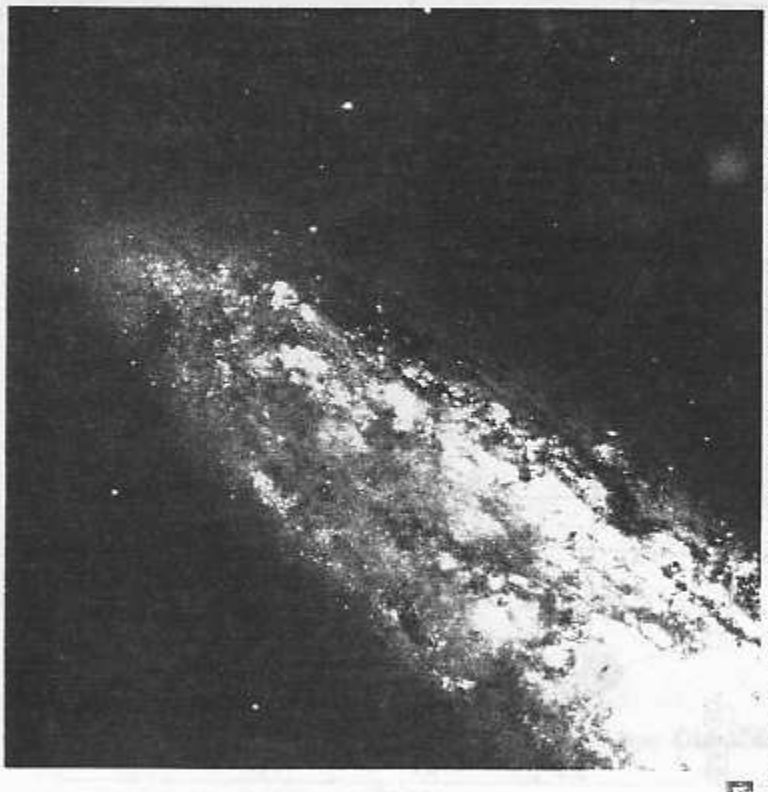
February 1999

The University Lowbrow Astronomers is a club of Astronomy enthusiasts which meets on the third Friday of each month in the University of Michigan's Physics and Astronomy building (Dennison Hall, Room 807). Meetings begin at 7:30 pm and are open to the public. Public star parties are held twice a month at the University's Peach Mountain Observatory on North Territorial Road (1.1 miles west of Dexter-Pinkney Road; further directions at the end of the newsletter) on Saturdays before and after the new Moon. The party is canceled if it's cloudy or very cold at sunset. For further information call (313)480-4514.

**Spiral Galaxy NGC 253**

**Photo and Text Credit:** WFI Team, ESO, MPI-A, OAC

Explanation: A camera with over 67 million pixels (digital picture elements) was used to record this stunning image of spiral galaxy NGC 253. Known as the Wide Field Imager (WFI), the camera is the latest instrument to be installed at the European Southern Observatory's 2.2 meter telescope in La Silla, Chile. Constructed from exposures made by the WFI in December 1998, this picture has been cropped from the full field to emphasize the galaxy and contrast adjusted to follow the graceful, winding arms and dramatic dust lanes of this photogenic island universe. Relatively bright foreground stars produce the sharp vertical streaks seen here while higher resolution versions of the image show intriguing, faint, background galaxies and likely globular star clusters associated with NGC 253. Two faint satellite trails are also visible. NGC 253, an Sc type spiral, is about 8 million light-years away in the southern constellation Sculptor.



Spiral Galaxy NGC 253 · MPG/ESO 2.2-m + WFI (Detail)

## This Month:

**February 13** - Public Star Party at Peach Mountain Observatory - Dress for the Arctic in February and see those Winter constellations in comfort.

**February 19** - Meeting at 807 Dennison - Our speaker tonight will be U of M Prof. Pat Sietzer presenting "The Lost Observatory".

**February 20** - Public Star Party at Peach Mountain Observatory – Venus is approaching Jupiter. See Mark Deprest's article on this conjunction inside this issue.

**February 21** - ATM Group - Mtg time & location TBD

## Next Month:

**March 13** - Public Star Party at Peach Mountain Observatory – The Coma-Virgo cluster is rising in the east. Watch those far away photons tonight.

**March 19** - Meeting at 807 Dennison - Tonight we will hear from the Mars Society speaking on the "Why Explore Mars".

**March 20** - Public Star Party at Peach Mountain Observatory – Spring begins at 8:46 pm EST – Just in time for our observing!

**March 21** - ATM Group - Mtg time & location TBD

# Its Conjunction Time

by Mark Deprest

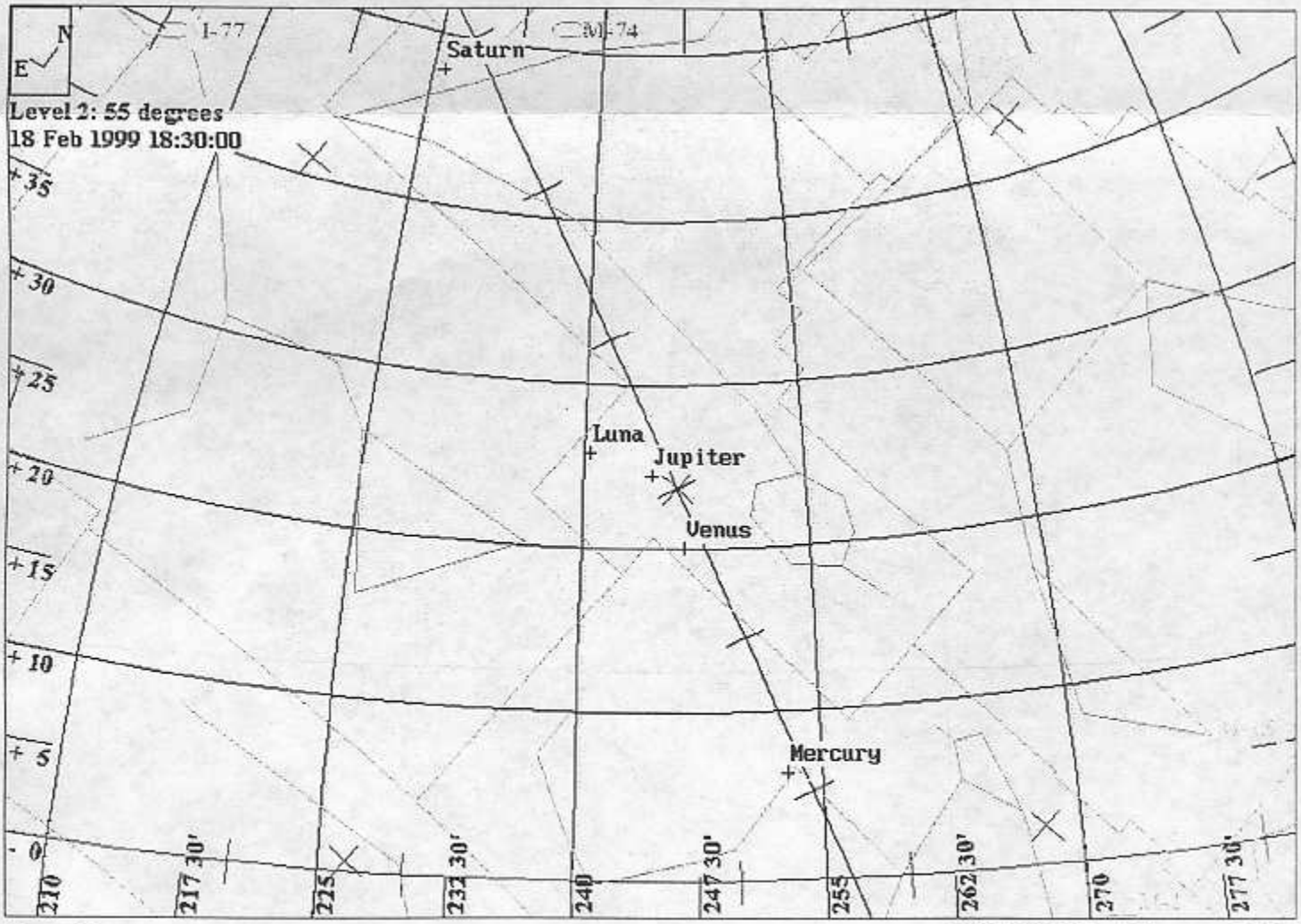
After scanning the numerous almanacs and astronomical calendars at my disposal, I find that we are about to witness a number of lunar and planetary groupings or conjunctions. The most spectacular of these will happen on February 23rd, when Jupiter and Venus will be less than 0.1 degree apart, but more on that later.

Lets start with the lunar / planetary grouping on February 18th, when the three day old crescent Moon will be less than 3 degrees of Venus and Jupiter. Don't miss this excellent opportunity to photograph the three brightest objects of the evening sky all in the same field of view. If conditions are right you might also capture a little "earthshine" in your photo.

Then from February 22nd through the next two weeks, four bright planets will be visible in the evening twilight. About 45 minutes after sunset look for Mercury just 10 degrees above the western horizon, Jupiter and Venus about 10 degrees higher and finally Saturn still well placed at about 40 degrees above the west - southwestern horizon.

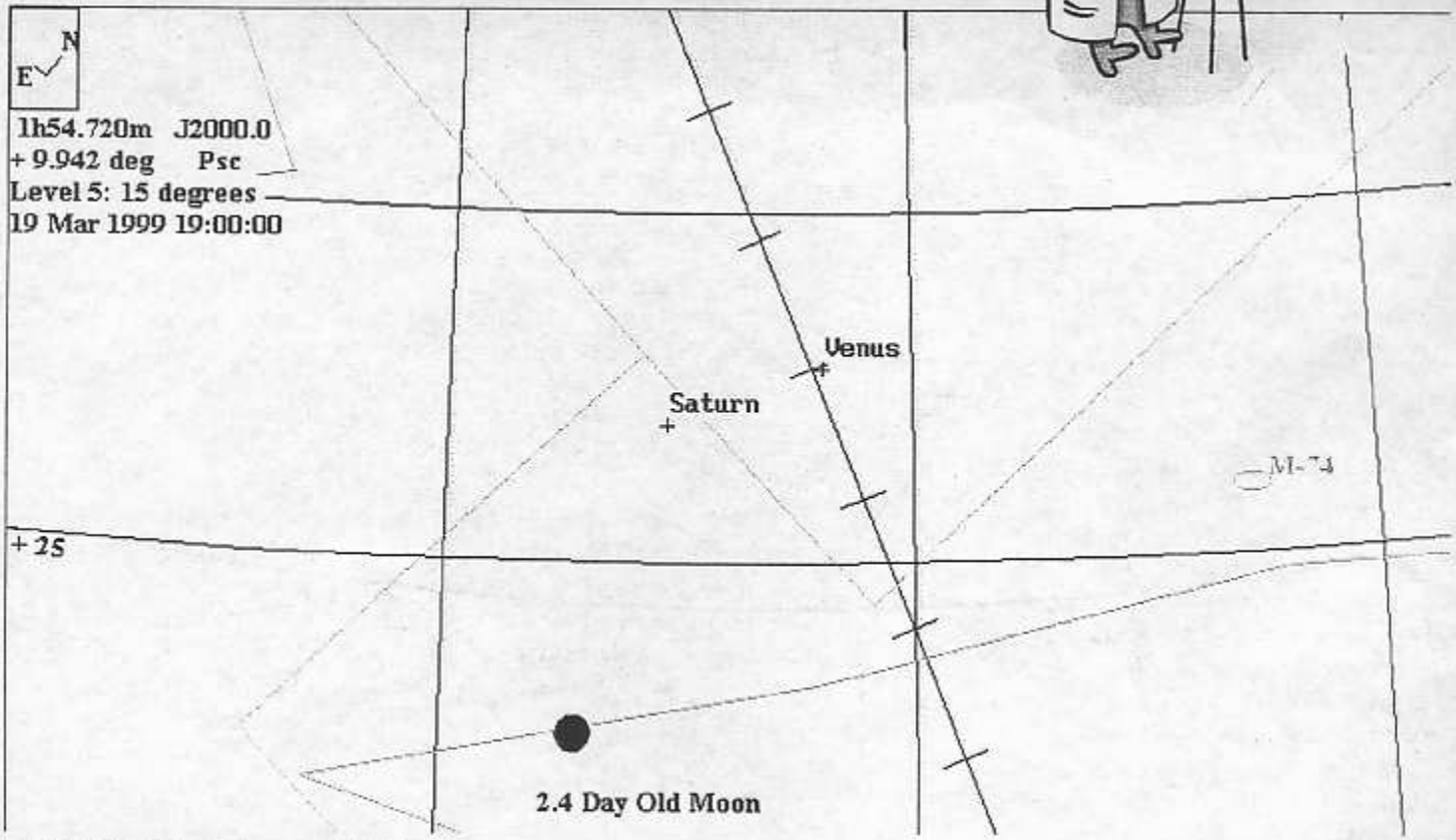
To see all of these planets lined up along the ecliptic, you are going to need three things of equal importance. First, and as usual the toughest, you will need clear skies. Second, you will need an unobstructed view of the southwest to western horizon. Third, you need to know precisely where and when to look. (See chart 1)

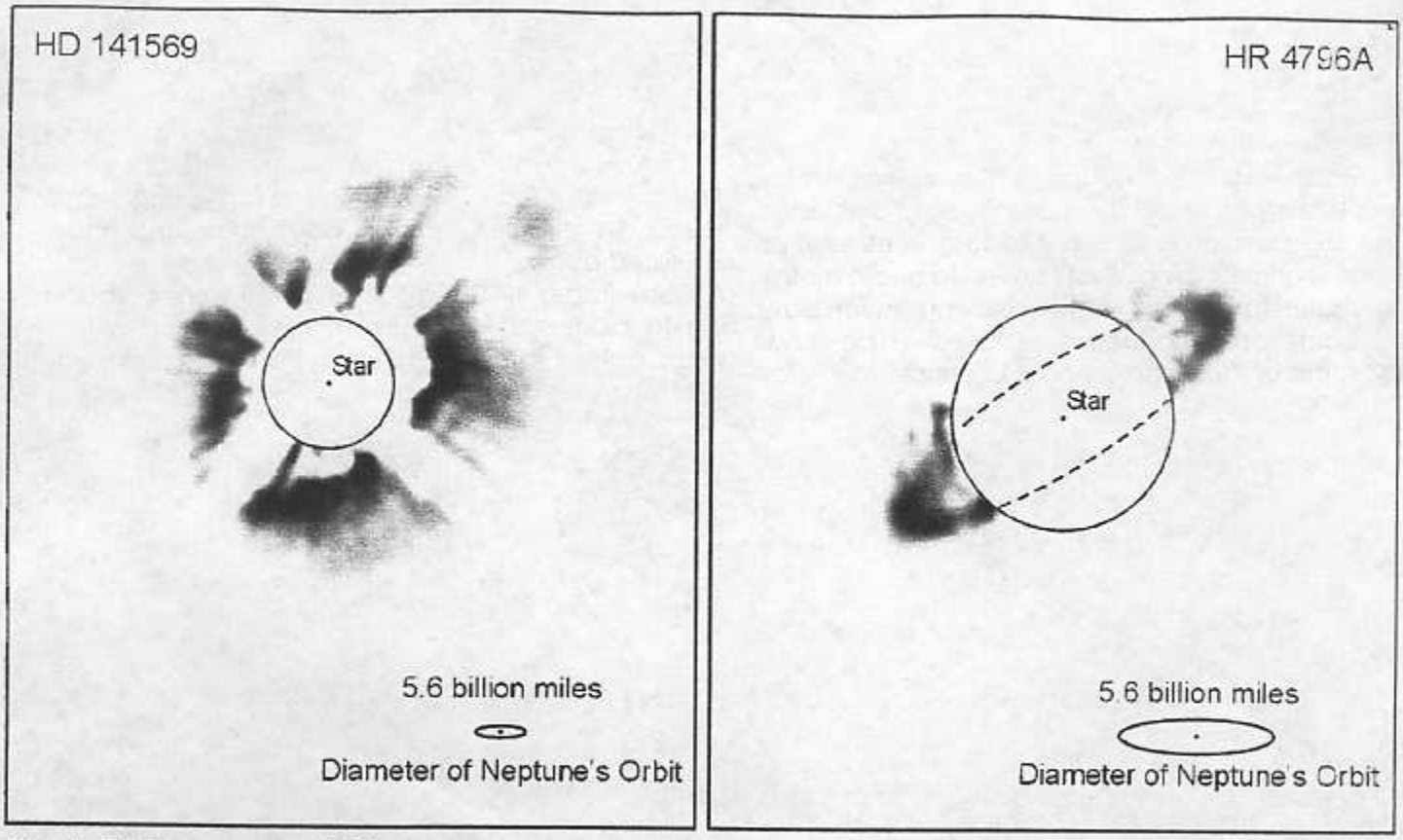
Now on February 23rd at 20:30 UT = 15:30 EST, Jupiter and Venus will be within 8' of each other. Both planets are bright enough to be seen at that time, but you will need some optical aid. This is another scene that you will need to know exactly where to look (See chart 2). At 23:30 UT = 18:30 EST this closest of planet - planet conjunction for the year, will still find Jupiter and Venus over 15 degrees above the southwestern horizon and less than 13' of separation between them. I definitely want to see some telescopic photographs of this. The two planets are bright enough that exposures of 1/4 to 1 second will be sufficient to capture the moment.




The last grouping of celestial objects I am going to mention in this article is the Lunar - Saturn - Venus of March 19th. This is another photographic challenge. The Moon is only a little over 2 days old and Saturn and Venus are only 2.4 degrees apart, the whole group will be about 18 plus degrees above the western horizon at 45 minutes after sunset. (See chart 3)

If we have some clear skies and you miss these.... Well... shame on you!
All charts produced with Guide 7.0






**Dust Disks around Stars** **HST • NICMOS**

PRC99-03 • STScI OPO • January 8, 1999
B. Smith (University of Hawaii), G. Schneider (University of Arizona),
E. Becklin and A. Weinberger (UCLA) and NASA

# Possible Planets And Infrared Dust

Text and Photos Credit: Left - A. Weinberger, E. Becklin (UCLA), G. Schneider (U. Arizona), NASA
Right - B. Smith (U. Hawaii), Glenn Schneider (U. Arizona), NASA

These near-infrared Hubble images of dust surrounding young stars offer the latest tantalizing evidence for planets beyond our Solar System. At left, the dark gap seen in the dust disk is reminiscent of a similar large gap in Saturn's rings believed to be sculpted by orbiting moons. By analogy, the gap in the dust disk of HD 141569 may be a larger scale result of unseen orbiting planets. At right is a relatively thin stellar dust ring suggestive of planetary rings held in place by orbiting moons. On a much larger scale this ring around the star HR 4796A could also indicate the presence of orbiting planet-sized bodies too faint to be directly visible. For a distance comparison, the orbit of Neptune is drawn at the lower right of each picture. The overwhelmingly bright starlight at the center has been blocked out to reveal the dim dust features.

Gap In Stellar Dust Disk May Be Swept Out By Planet
A striking NASA Hubble Space Telescope near-infrared picture of a disk around the star HD 141569, located about 320 light-years away in the constellation Libra. Hubble shows that the 75 billion-mile wide disk seems to come in two parts: a dark band separates a bright inner region from a fainter outer region. The structure superficially looks much like the largest gap in Saturn's rings - but on a vastly larger scale.

Dust Ring Around Star Offers New Clues Into Planet Formation. A NASA Hubble Space Telescope false-color near infrared image of a novel type of structure seen in space - a dust ring around a star. Superficially resembling Saturn's rings -- but on a vastly larger scale -- the "hula-hoop" around the star called HR 4796A offers new clues into the possible presence of young planets.

## Observing Tips

By Mark Deprest

Well, since I find myself with a little extra time on my hands lately (I'm currently unemployed). I decided to put together an article or two for the newsletter. This one is a list of things that I have learned over the years that help to make every observing session both pleasurable and productive. I need to acknowledge some of the people whom I consider to be my MENTORS and TEACHERS. They are the ones who really wrote this list: Mark Cray, Bernard Friberg, Kirk Hillig, Chris Sarnecki and Doug Scobel. When I was starting out, a few years back, these were the people who took me under their wings and showed me their "Secrets of Success."

1. Buy equipment you will use! Mark Cray helped me understand the importance of this. Buying or building that huge "light bucket" may sound like the perfect scope, until you get to the loading, unloading, setup and adjusting that beast of a scope every time you go to your favorite dark site. Make your equipment is convenient and it will get used. Thank you, Mark.

2. Buy some good binoculars! I have a pair of 11 x 50's that I use every time I go out observing. Bernard Friberg turned me onto the best way to scan the sky with binoculars and just enjoy the grandeur of the night sky 3 to 5 degrees at a time. Just scanning the Milky Way for fun, looking at that fuzzy patch, or trying to find a neat star cluster, they are invaluable. Thank you, Bernard.

3. Get a zero power finder! This is something I learned on my own. As most of you know I can't find a thing with a powered finder scope, but give me a "Telrad" and a good chart and I'll show you the Universe (well, that maybe a bit of an exaggeration). There are a number of different zero power finders on the market. I prefer the 3 reticule circles of the "Telrad" for making sure that the star you think you are starting to hop from is really the one in your eyepiece.

4. Make a list and check it twice! Here is a tip that I learned from both Chris Sarnecki and Doug Scobel. Although their personal passions may lead them to different objects, with Chris leaning toward double stars and small "colorful" clusters, and Doug to the "faint fuzzy" with a particular fondness for planetary nebulae. Both come prepared with a well-made list of objects for that night's session. I usually show up with a small group of charts showing the location of 3 to 5 objects that I have never seen before as well as a few I'd like to examine again. Thank you both, Chris and Doug.

5. Dress warmly! I don't know a single amateur astronomer that hasn't learned this. I find that the "multiple layer" method works best, you can always take something off if it gets too warm, but you can't put on what you don't have. Also, remember that nothing will kill an evening of fine observing faster than cold feet, so get some warm socks and good insulated boots.

6. Don't forget it! Doug Scobel and I were carpooling to a Messier Marathon at Lake Hudson a few years back. I watched Doug load his equipment into his van, and in this process I noticed him going over a mental list of all the things he'd need for that all night observing session. This inspired me to make an actual written list of the equipment that I take out when I go observing. I check that list every time I go out, because nothing can ruin a good night faster than not have that _____. Thank you, Doug.

7. Take a break! Watch Kirk Hillig when he comes out to an Open House or an observing session, he always has a comfortable lawn chair or two. Just for kicking back and taking a break from the eyepiece. I find that after a couple of hours at the scope my eyes need a little rest and a chance to get off my feet is always appreciated. I like to take that time to catch up with my friends and fellow astronomers. Thank you, Kirk for showing me how to relax.

Well, there are probably many other things one could add to this list, but I've gone on long enough. I would like to say again, "Thank you, to all of you who share you knowledge, experience and expertise with not only me, but the countless others and in turn help make astronomy an enjoyable way to pass the nighttime."

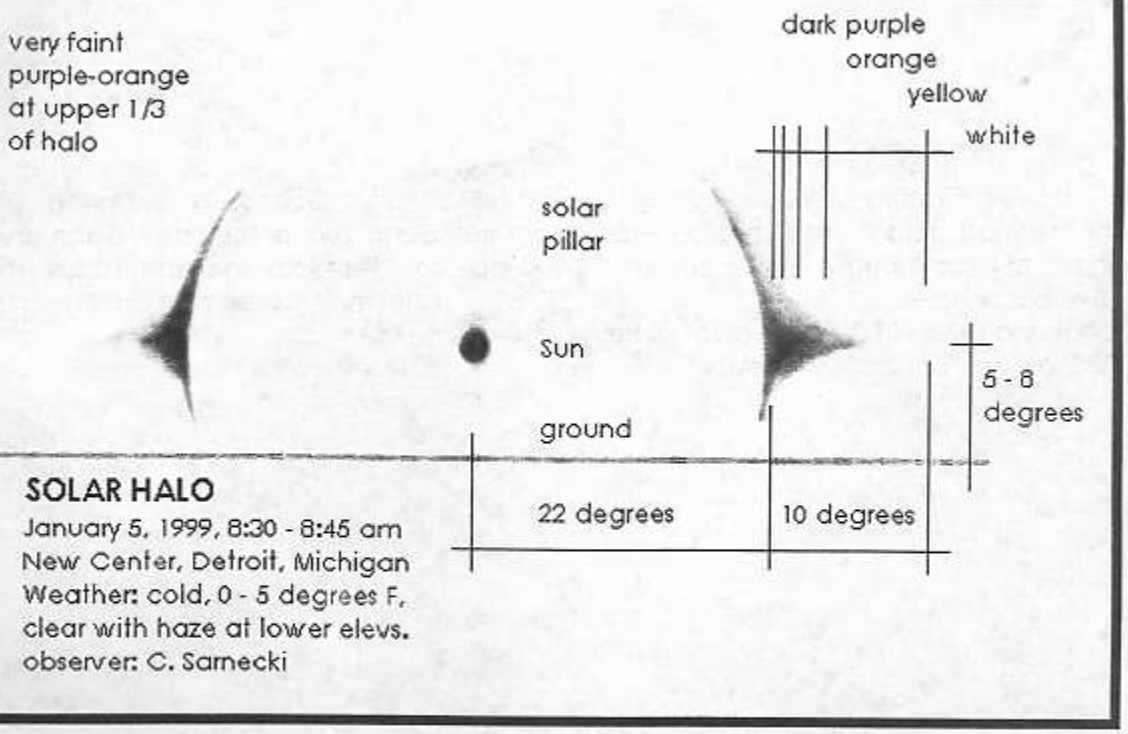
## Three Rising Suns

By Christopher Sarnecki

I once heard an architect give a presentation, without using any visual aids, about a building he designed. He said he would paint a "word picture" of his design and proceeded to develop an image in the minds of his listeners that was every bit as effective as if he had used the best high-tech visual aids. In this article I would like to paint a word picture, but I will use the image in this article to illustrate my word picture. You have to fill in the rest of the image, so read on and lets see where this takes us.

I am always on the lookout for solar, lunar, and planetary happenings in the sky on my long drive to and from work. On a routine drive to work recently, I noticed the beginnings of a nice solar pillar poking

out through some faint clouds. It was really quite picturesque; a smart little solar pillar above an inverted crescent shaped solar disk cropped by the clouds and morning haze. Solar pillars are caused by sunlight *reflecting* off ice crystals floating in the atmosphere. They exhibit a shaft of light usually above the rising or setting Sun but sometimes below it as well. The pillars are often colored golden orange by the rising or setting Sun.




**SOLAR HALO**
January 5, 1999, 8:30 - 8:45 am
New Center, Detroit, Michigan
Weather: cold, 0 - 5 degrees F, clear with haze at lower elevs.
observer: C. Sarnecki

Ten minutes later I arrived at my destination and just before turning into the parking deck I witness an extremely bright sundog off to one side of the General Motors building in the New Center area of Detroit. Sundogs are sometimes referred to as mock suns or parhelia and can occur on either side of the Sun. Sundogs are an atmosphere phenomena caused by sunlight *refracting* off the sides of hexagonal shaped ice crystals and appearing 22 degrees either side of the Sun. Because the sunlight is refracted it spreads the light out into different hues; but because the light is smeared to colors are not as separated as we see in a rainbow. I typically see orange, closest to the Sun, to yellow, with white farthest from the Sun. On this occasion the sundog was extremely bright. It was so bright I thought it was the Sun itself. Upon inspection I noticed a dog "tail" or streamer extending horizontally from the sundog and away for the Sun. Also noticed as the start of an arc or halo forming above the sundog and arcing around the Sun.

Having seen a similar solar event about five years ago I decided I would have to record this event and started to make a mental image in my mind. Well, I thought this looks like the start of something interesting but a large building blocked my view. The General Motors building, when constructed back in our parent's time, was the largest office building in the world at 1.3 million square feet in size. With this structure blocking the Sun and the growing halo I needed to see the other side of the Sun to confirm the companion sundog and complete the halo. So I ran to work, climbed up to the upper floor of our office building and confirmed the view you see in the sketch. The complete solar halo was present although it was faint at the upper third of the halo. Colors present were dark purple, to orange, to yellow, and white. The two sundogs were as bright as the rising Sun. I quickly made a pencil sketch of what I had just seen all the while not understanding why my fellow co-workers were not looking out their windows to admire the view.

Now complete my "word picture" and paint in some huge office buildings in front of this quarter sky view and you will see the image of three rising Suns as observed on an early January morning.

## Scientists of Sloan Digital Sky Survey Discover Most Distant Quasar

Batavia, Ill. – Scientists of the Sloan Digital Sky Survey have announced the discovery of the most distant quasar ever observed. At a December 4 collaboration meeting at the Department of Energy's Fermi National Accelerator Laboratory near Chicago, Princeton University graduate student Xiaohui Fan broke the news. Using data from only the first months of the initial shakedown operation of new sky-mapping technology, Fan said, the Sky Survey had already discovered three of the four most distant quasars currently known.

"We could identify these quasars so readily," Fan said, "because of the Sky Survey's unique characteristics: its superb telescope and camera, the power of the analysis software, and the large amount of sky it can cover."

Sky Survey astronomer Michael Strauss of Princeton University, Fan's faculty advisor, described the discovery of the most distant of all quasars -- compact yet luminous objects thought to be powered by supermassive black holes.

"Xiaohui and I were in the basement of Peyton Hall at Princeton, operating the 3.5-meter diameter telescope at Apache Point Observatory over the Internet to follow up on quasar candidates from the Sky Survey data. It was 1:30 a.m. on Thanksgiving morning, and we only had about half an hour of observing time left. Xiaohui suggested observing one of our last promising high-redshift quasar candidates before we finished up. As soon as we saw the spectrum, we knew we had a record-breaking quasar."

Secretary of Energy Bill Richardson congratulated the Sky Survey astronomers on their discovery.

"You are extending the frontiers of human understanding into new and uncharted territory," Secretary Richardson said. "I am proud that the Department of Energy supports science that spans the entire panorama of our universe, from the inner recesses of the proton to the outermost reaches of space."

Remarkably, the Sky Survey telescope at Apache Point Observatory in southern New Mexico unveiled the three quasars during an early stage of its commissioning, after examining just a narrow slice of the sky -- the first one percent of its planned sky coverage. Only a portion of that data has so far been analyzed. Members of the team were still calibrating instruments, building data archives, and installing a new monitor telescope when the discovery data were taken in September, just months after first light.

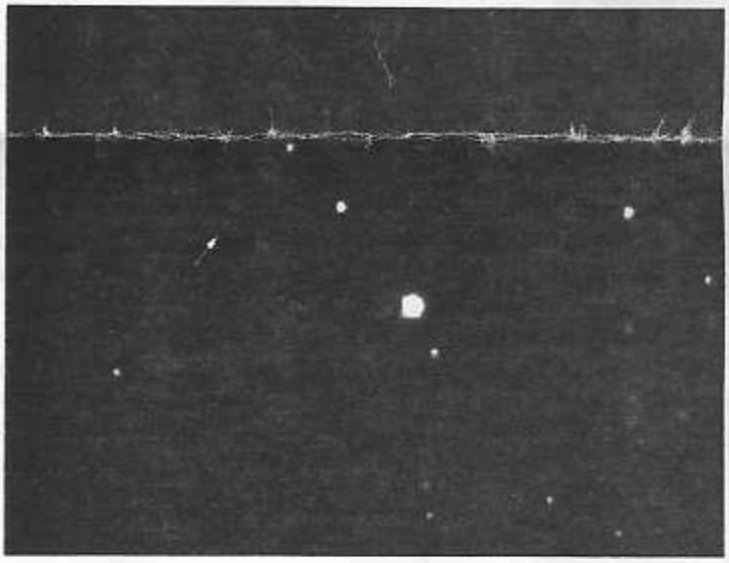
"The National Science Foundation is gratified to see the promise of the Sloan Digital Sky Survey being realized, even in these early results," said Hugh Van Horn, director of NSF's Division of Astronomical Sciences. "We are eager to see the resulting data archive become publicly available to all qualified U.S. astronomers, and we are working with the project to help expedite this release."

More than 80 scientists meeting at Fermilab, near Chicago received the news enthusiastically, cheering a series of color images and spectral plots that revealed the new record-holders, quasars with redshifts of 5.0, 4.9, and 4.75. Redshift is the amount by which light is shifted toward the red end of an object's spectrum by the expansion of the universe. Astronomers use redshift as a measure of the distance of celestial objects: the higher the redshift, the greater the distance and the younger the universe when the light was emitted. The newly discovered quasars mark an epoch when the universe was less than a billion years old and a sixth of its current size.

The most distant quasar now surpasses a quasar discovered in 1991 at a redshift of 4.89 by astronomers Donald Schneider, Maarten Schmidt and James Gunn. Two of the three, Gunn and Schneider, were at the Fermilab meeting Friday morning, applauding with their colleagues at the announcement of the news.

"The results are revolutionary," Schneider, a Sky Survey collaborating astronomer from Pennsylvania State University, said afterward. "What we have found is not totally unexpected but it is extraordinary at this early stage. Looking at only one percent of the data and using prototype software and only a preliminary calibration to evaluate it, we have achieved an 70 percent success rate in identifying bright high-redshift quasars. At the current rate of discovery, by the end of the Survey we should find more than 500 quasars with redshift greater than 4.75."

To continue with the remainder of this story point your web browser to http://www.sdss.org/news/releases/19981208.qso.html



The arrow in this image points out the record-breaking redshift 5.0 quasar discovered by the Sloan Digital Sky Survey. That faint red dot of light represents an object that is actually a hundred times as luminous as a typical galaxy. Sky Survey astronomers identified this object as a possible high-redshift quasar on the basis of its exceptionally red color compared to ordinary stars and galaxies. Follow-up spectroscopy with the ARC 3.5-meter telescope confirmed that this unassuming speck was indeed the most distant quasar known to date. *Image credit: SDSS Collaboration Image distributed by: Fermilab Visual Media Services.*

# Saturday Morning Physics

## in the SPRING!

Featuring free public presentations by U-M faculty

**10:30 to 11:30 AM, 170 Dennison**

## Feb. 20 & 27

### Professor Franco Nori: Collective Motion and Avalanches: from superconductors to sand dunes

Falling sand in an hourglass builds up in a cone grain by grain until one grain too many bring the sides crashing down. Snow on a mountain side builds up flake by flake until one flake too many unleashes an avalanche. Many natural systems, both large-scale and small-, exhibit this type of avalanche behavior. Professor Franco Nori will describe collective motion, including avalanches, in several physical systems: from the microscopic motion of flux lines in superconductors (discussed in one lecture) to the stick-slip movement of sand avalanches (presented in another lecture). More information on this work, including videos, is online at http://www-personal.engin.umich.edu/~nori.

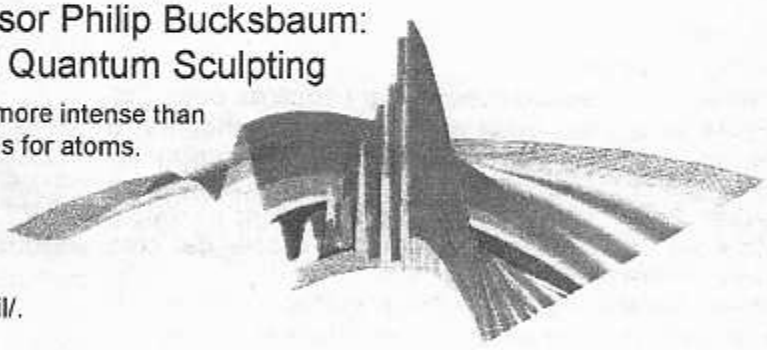
## Mar. 13, 20, & 27

### Professor Gabriel Weinreich: The Physics of Making Music

Most objects that can generate noise, such as a frying pan or fire alarm, are not acceptable for making music for at least two reasons: First, a "musical instrument" must provide its player with a degree of control sufficient to make the resulting sounds "expressive"; second, and especially in Western music, a "musical instrument" must be able to find its place in a structure that is highly harmonic. In this set of three lectures, Professor Weinreich will explore the physics that underlies three types of actual musical instruments: (a) those whose sounds come from freely vibrating objects (example: piano); (b) those whose sounds come from continuously driven vibrating objects (example: violin); (c) those whose sound is generated electronically (example: computer music).

## Apr. 3 & 10

### Professor Philip Bucksbaum: Intense Light and Quantum Sculpting



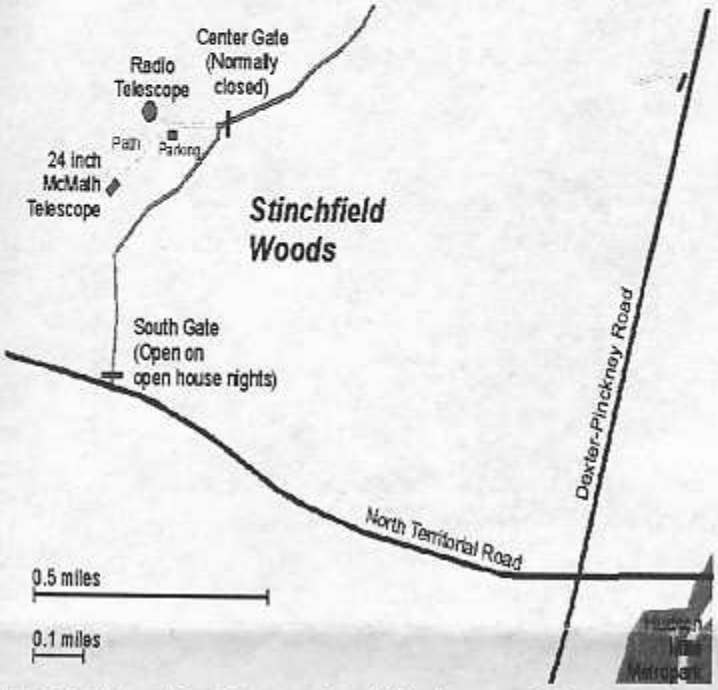
The brightest lasers far outshine the sun; they are even more intense than a hydrogen bomb. Intense laser pulses are sculpting tools for atoms. Professor Bucksbaum will show that, using such lasers, physicists can push and pull internal electrons and can even cut away parts of these tiny quantum structures. More information on Professor Bucksbaum's work is online at http://gomez.physics.lsa.umich.edu/~phil/.

## Sponsored by the University of Michigan Physics Department

**(734) 764-4437** **http://www.physics.lsa.umich.edu/saturday**

## Places and Times:

Dennison Hall, also known as The University of Michigan's Physics and Astronomy building, is the site of the monthly meeting of the University Lowbrow Astronomers. It is found in Ann Arbor on Church Street about one block north of South University Avenue. The meeting is held in room 807. Monthly meetings of the Lowbrows are held on the 3rd Friday of each month at 7:30 PM. During the summer months, and when weather permits, a club observing session at Peach Mountain will follow the meeting.




Peach Mountain Observatory is the home of The University of Michigan's 25 meter radio telescope as well as the University's McMath 24 inch telescope which is maintained by the Lowbrows. The observatory is located northwest of Dexter. The entrance is on North Territorial Road, 1.1 miles west of Dexter-Pickney Road. A small maize-and-blue sign marks the gate. Follow the gravel road one mile to a parking area near the radio telescopes. Walk along the path between the two fenced in areas (about 300 feet) to reach the McMath telescope building.

## Public Star Parties:

Public Open House/Star Parties are held on the Saturday before and after each new Moon at the Peach Mountain Observatory. Star Parties are canceled if the sky is cloudy at sunset or the temperature is below 10 degrees F. Call 480-4514 for a recorded message on the afternoon of a scheduled Star Party to check on the status. Many members bring their telescopes and visitors are welcome to do likewise. Peach Mountain is home to millions of hungry mosquitoes - bring insect repellent, and it does get cold at night so dress warmly !

Amateur Telescope Making Group meets monthly, with the location rotating among member's houses. See the calendar on the front cover page for the time and location of next meeting.

## Membership:

Membership dues in the University Lowbrow Astronomers are $20 per year for individuals or families, and $12 per year for students and seniors (age 55/+). This entitles you to the monthly REFLECTIONS newsletter and the use of the 24" McMath telescope (after some training). Dues can be paid to the club treasurer Doug Scobel at the monthly meeting or by mail at this address:

1426 Wedgewood Drive
Saline, MI 48176

## Magazines:

Members of the University Lowbrow Astronomers can get a discount on these magazine subscriptions:

Sky and Telescope: $27 / year
Astronomy: $27 / year
Odyssey: $16.95 / year

For more information contact the club Treasurer. Members renewing subscriptions are reminded to send your renewal notice along with your check when applying through the club Treasurer. Make the check payable to "University Lowbrow Astronomers".

## Newsletter Contributions:

Members and (non-members) are encouraged to write about any astronomy related topic of interest. Call or E-mail to Newsletter Editors at:

Bernard Friberg (743)761-1875 Bfriberg@aol.com
Chris Sarnecki (734)426-5772 chrisandi@aol.com

to discuss length and format. Announcements and articles are due by the first Friday of each month.

## Telephone Numbers:

| | | |
|---|---|---|
| President: | Mark Deprest | (734)662-5719 |
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| | Dave Synder | (734)747-6537 |
| | Paul Walkowski | (734)662-0145 |
| Treasurer: | Doug Scobel | (734)429-4954 |
| Observatory Director: | Bernard Friberg | (734)761-1875 |
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| | Bernard Friberg | (734)761-1875 |
| Keyholders: | Fred Schebor | (734)426-2363 |
| | Mark Deprest | (734)662-5719 |

## Lowbrow's Home Page:

http://www.astro.lsa.umich.edu/lowbrows.html

Dave Snyder, webmaster
http://www-personal.umich.edu/~dgs/lowbrows/

Monthly Meeting

February 19, 1999, 7:30 pm

Room 807 Dennison Hall

Physics & Astronomy Building

The University of Michigan

Dr. Pat Sietzer

Assistant Professor of Astronomy

The University of Michigan

Presents

# The Lost Observatory


University Lowbrow Astronomers

Ann Arbor, Michigan

UNIVERSITY LOWBROW
ASTRONOMERS
3684 Middleton Drive
Ann Arbor, Michigan 48105

DETROIT MI 482
PM
03 FEB
1999


11/1999

Lowbrow's WWW Home Page:
www.astro.lsa.umich.edu/
lowbrows.html

Check your membership expiration date on the mailing label!