

OBSERVER

Newsletter of the Denver Astronomical Society
One Mile Nearer the Stars

A Perfect Storm? The 2002 Leonids are Coming!

On the morning of Nov. 19 you have a chance to witness one of the great astronomical events of the 21st century. No, don't run out to buy that telescope with five terabytes of deep-sky object computer data in it to see this. All you need do is find a dark site away from city lights and use your own two eyes, a lawn chair or recliner and warm blanket. Amateur

Continued on page 7

Leonids 2001 Composite Image: © 2002 Chris Tarr

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NOVEMBER SKIES 2002

This month we are deep into the dark skies of fall—hunting season is underway. The autumn constellations are high overhead early in the evening, while the constellations of summer and the Milky Way are hanging in our western sky waiting for the final call of winter to leave us. High in the sky is the winged horse Pegasus, also known as the “Great Square.” Pegasus contains some great deep-sky objects like the giant edge-on spiral gal-

4	.....	New moon
11	.....	First quarter moon, Double shadow transit on Jupiter
18-19	.....	Leonid meteor shower peaks
19	.....	Full moon, Penumbral lunar eclipse (First contact at 4:32 P.M. MST)
27	.....	Last quarter moon

axy NGC 7331 and the quintet of galaxies, “Stephan’s Quintet.” Nearby in Andromeda is the planetary nebula known as the “Blue Snowball” (NGC 7662). Andromeda and Triangulum contain the closest and largest galaxies to our Milky Way—the Great Andromeda Galaxy (M31) with its two companions—and the Triangulum Galaxy (M33). Very large but faint because the light is spread over a large area, M33 is a good test of observing skill and your sky. M31 can be seen naked-eye from a dark site or even observed from the city with binoculars or a telescope. Find them on your star charts and hunt them down. You won’t need an orange vest or camouflage, but a bit of skill in reading your chart with a red flashlight will help. Of course, the greatest quarry of November will come from the king of the early morning sky, Leo the Lion. Read more about the Leonids above and on page 7. Happy hunting.—Ron Pearson

PRESIDENT'S CORNER

I'm sad to announce that we've temporarily lost our president and my close friend, Larry Brooks.

Sometime after 10 P.M. on October 20th he suffered a major stroke. Unfortunately, living alone, he was not found until the evening of the 21st. His daughter Shawna went to his house to check on him when he failed to respond to his phones. The clot was caused by a bout of arrhythmia that hospitalized him two weeks prior. The stroke has affected his speech and his right side. He is unable to move his right arm but his leg reacts to stimulus. After almost two weeks he is now eating on his own and trying to communicate. The words just don't come out right and he is frustrated. Occasionally he can make us understand but answers "yes" to everything. He is in Swedish Hospital and will soon be moved to the rehab area. Our hope is that he will recover and once again be the



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Chuck Carlson (left) and Larry Brooks during Colorado Astronomy Day's Open House at Chamberlin Observatory.

Image: © Steve Solon, 2002

Larry we all know, bad jokes included. This will be a long process and he will need lots of help. His progress already has been encouraging and we can only hope that it will continue at a steady rate. On a lighter note, one of his first meals was lasagna and he was trying to scrape off the cheese. He severely restricts the fats in his diet and this tells me that the Larry I know is in there somewhere.—
Dan Wray (November 2, 2002)

DAS Schedule

NOVEMBER

- 1-3 Dark Sky Site Weekend
- 8 E-Board meeting, 8 P.M.
- 9 **Clean-up Day (CANCELLED)** but, Still Happening, **Open House** (the Open House begins at dusk.)
- 22 General Meeting at Olin Hall, DU, 7:30 P.M.—Steve Solon (DAS), "The DAS — Us 'n Stuff," and Annual Membership Show & Tell
- 28 Happy Thanksgiving!
- 29 Chanukah begins at sunset

DECEMBER

- 6-8 Dark Sky Site Weekend
- 13 E-Board meeting, 8 P.M.
- 14 **Clean-up Day** (4:00 P.M.) and **Open House** (the Open House begins at dusk.)
- 21 Holiday Party (takes the place of the general meeting. The December Observer will contain details.)
- 25 Christmas Day

Public nights are held every Tuesday and Thursday evenings beginning at the following times:
October 1 - March 31 at 7:00 P.M.
April 1 - September 30 at 8:30 P.M. at Chamberlin Observatory
Costs to non-members are: \$3.00 adults, \$2.00 children.
Please call (303) 281-9052 for reservations.

DAS Officers

President:

Larry Brooks (303) 986-5255
Email: LBrooks100@aol.com

Vice President:

Carla Swartz (303) 246-6926
Email: CSastrogirl@aol.com

Secretary:

Ron Pearson (303) 670-1299
Email: rpearson@ecentral.com

Treasurer:

Chuck Carlson (303) 744-7331
Email: chcarlo@du.edu

ALCor:

Jerry Sherlin (303) 680-6894
Email: SHERLINJ@aol.com

Chief Observer:

Jack Eastman

Executive Board Members

Ted Cox	Sandy Shaw
Jack Eastman	David Shouldice
Joe Gafford	Steve Solon
Patti Kurtz	Dan Wray
George Jones, Past President	

DAS Information Line:

(303) 986-5255

DAS Correspondence:

Denver Astronomical Society
c/o Larry Brooks
3686 South Depew, #8
Denver, Colorado 80235

Van Nattan Scholarship Fund

P.O. Box 150743
Lakewood, Colorado 80215-0743

Webmistress:

Patti Kurtz
Email: pkurtz@starfirecreations.com

Newsletter:

Denver Observer editor, Patti Kurtz
StarFire Creations Unlimited
(303) 948-5825

The Observer is available in color PDF format from the DAS website.

The Executive Board conducts the business of the DAS at 8 P.M. at Chamberlin Observatory. Please see the Schedule of Events for meeting dates. All members are welcome.

www.denverastrosoociety.org

Black Holes: Feeling the Ripples

Astronomers have finally confirmed something they had long suspected: there is a super-massive black hole in the center of our Milky Way galaxy. The evidence? A star near the galactic center orbits something unseen at a top speed of 5000 km/s. Only a black hole 2 million times more massive than our Sun could cause the star to move so fast. (See the Oct. 17, 2002, issue of *Nature* for more information.)

Still, a key mystery remains. Where did the black hole come from? For that matter, where do any super-massive black holes come from? There is mounting evidence that such “monsters” lurk in the middles of most galaxies, yet their origin is unknown. Do they start out as tiny black holes that grow slowly, attracting material piecemeal from passing stars and clouds? Or are they born big, their mass increasing in large gulps when their host galaxy collides with another galaxy?

A new space telescope called LISA (short for “Laser Interferometer Space Antenna”) aims to find out.

Designed by scientists at NASA and

the European Space Agency, LISA doesn't detect ordinary forms

of electromagnetic radiation such as light or radio waves. It senses ripples in the fabric of space-time itself—gravitational waves.

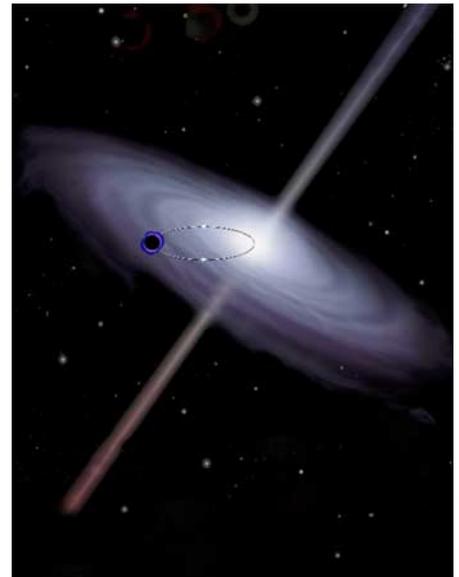
Albert Einstein first realized in 1916 that gravitational waves might exist. His equations of general relativity, which describe gravity, had solutions that reminded him of ripples on a pond. These “gravity ripples” travel at the speed of light and, ironically, do not interact much with matter. As a result, they can cross the cosmos quickly and intact.

Gravitational waves are created any time big masses spin, collide or explode. Matter crashing into a black hole, for example, would do it. So would two black holes colliding. If astronomers could monitor gravitational waves coming from a super-massive black hole, they could learn how it grows and evolves.

Unfortunately, these waves are hard to measure. If a gravitational wave traveled from the black hole at the center of our galaxy and passed through your body, it would stretch and compress you by an amount far less than the width of an atom. LISA, however, will be able to detect such tiny compressions.

LISA consists of three spacecraft flying in formation—a giant triangle 5 million km on each side. One of the spacecraft will shoot laser beams at the other two. Those two will echo the laser signal right back. By comparing the echoes to the original signal, onboard instruments can sense changes in the size of the triangle as small as 0.000000002 meters (20 picometers).

With such sensitivity, astronomers might detect gravitational waves from all kinds of cosmic sources. The first,



Artwork Courtesy: NASA

Artist's rendering of a black hole.

however, will probably be the weightiest: super-massive black holes. Will “feeling” the ripples from such objects finally solve their mystery, or lead to more questions? Only time will tell.... Scientists hope to launch the LISA mission in 2011.

Astro Trivia

(Look for the answer in this issue.)

Q. What was Baby Ida?

AstroTrivia is contributed by Sandy Shaw.

Note from the editor:

Many thanks this month to **Ron Pearson**, DAS Secretary, who wrote the text for the front page of this issue.

Thanks also to **Dan Wray** who wrote this month's President's Corner and continually keeps us updated on Larry Brook's condition.

Newsletter contributions (ccd and film astrophotos, members with telescopes, star party candid, short observing anecdotes, observing and imaging tips, etc.) are welcome and encouraged. This is your chance to strut your stuff! **Please call me for submission instructions.**

***Patti Kurtz*

(303) 948-5825

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Sky & Telescope sends only one notice before subscriptions end. The DAS sends only one issue of The Denver Observer after dues expire. The cost of magazines (Astronomy and Sky & Telescope) is in addition to the annual dues. For questions concerning memberships, please contact DAS Treasurer, Chuck Carlson (chcarlso@du.edu). See the back page of this newsletter for more information.

u p d a t e s

Colorado Astronomy Day in Pictures

Photos by Steve Solon and Dan Wray



The Cryogenics Cart at the Denver Museum of Nature & Science (Or, how cold is space anyway?), left.

Look, Ma! If I keep this up, I'll soon have no hands! Sarah Strand, Nick Kurtz, and Neil Pearson (clockwise in photo) regaled their audiences with the cool magic of liquid nitrogen and anything they could dip into it with their gloved, or ungloved hands. They had so much fun (as did the visitors) that they ran out of the precious liquid. They've been promised twice as much next year!

Daytime activities at the museum also included terrific speakers, South American tales, the Starlab, comet-making, and solar observing on the Sky Terrace. Counterclockwise from the photo below: Club members Bill Omsby, Tim Pimentel, and Mark Vincent on the Sky Terrace; Tim Pimentel with a mother and her daughter; and Ted Cox helps a visitor see our own star while Bill looks on.

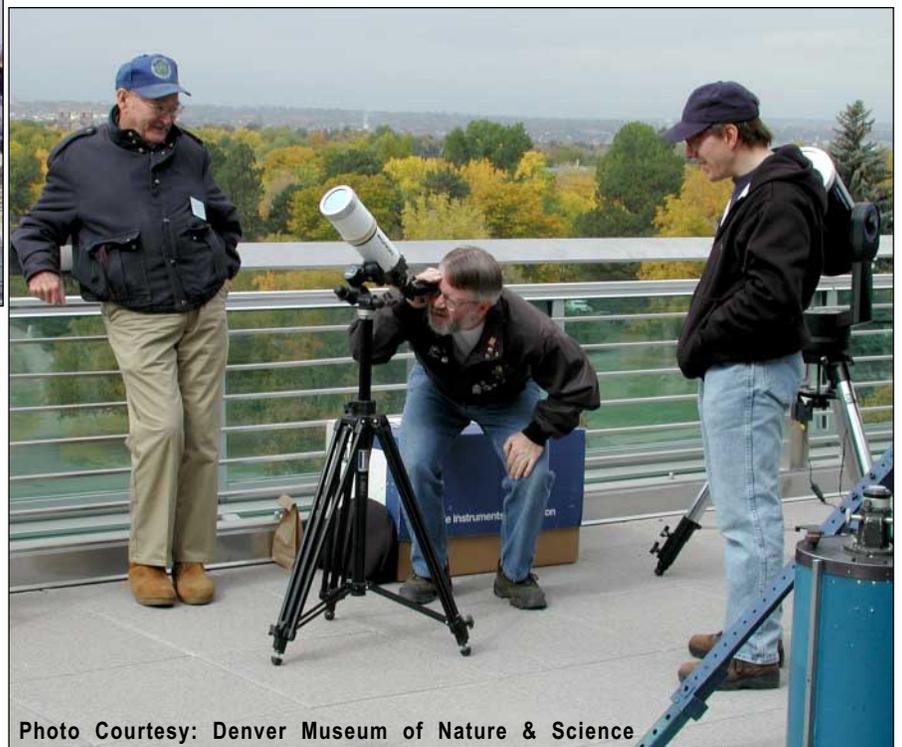


Photo Courtesy: Denver Museum of Nature & Science

colorado astronomy day



After enjoying many of the museum activities, almost 500 people joined DAS members at Chamberlin for an evening under the stars. Clockwise from the top: A crowd throngs around Wayne Kaaz's telescope; Mother shares the sun with her daughters; Neil, Marilyn, and Ron Pearson man the DAS table at the museum; inside Chamberlin during the star party, solar observing on the Sky Terrace; a brazen shot in the dark at Chamberlin, and Dan Wray checks out the sun.



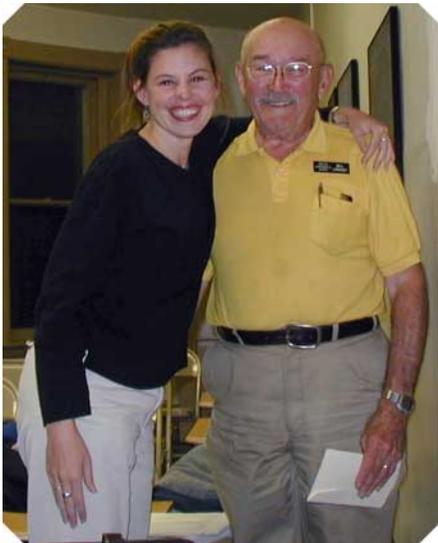
Photo Courtesy: Denver Museum of Nature & Science



colorado astronomy day

PARTICIPATION PRIZE WINNER!

Image: © Ro Pearson, 2002



Congratulations to Bill Ornsby, the DAS's first participation prize winner!

As a long-term member of the DAS, the contributions Bill has made over the years make up quite an impressive and long list. Operating the 20" Alvan Clark, lecturing to public night groups, working at open houses and assisting in numerous receptions, annual picnics and banquets are just a few activities to which Bill has devoted his time and knowledge. Formally recognizing his dedication to the DAS is long overdue.

Prior to developing a hobby in astronomy, he was an air traffic controller at Stapleton Airport. As a child, Bill witnessed the atrocious attack on Pearl

Harbor, later joining the service himself for five years. Bill is also an experienced Hamm radio operator and spends time every month as an examiner for those wishing to test for their licenses.

Bill owns an 8-inch Dob, a short tube 80, a 4-inch refractor and as a budding astrophotographer, the \$30 gift certificate to S&S Optika will come in handy to purchase much-needed accessories. The next DAS participation prize drawing will be held at the annual banquet on December 21st and the prize will be one of the following: yearly DAS membership dues or a subscription to Sky and Telescope or Astronomy. By volunteering for public nights, open houses, school star parties, clean up days at Chamberlin or work days at the Edmond G. Kline Dark Site you, too, can become eligible for a participation prize.

DAS participation prize slips are available at DAS functions. Please see an E-board member for a slip and their signature to become eligible for the next drawing. Remember the more you volunteer, the more chances you have at winning a prize.

Thanks again Bill, for your continuous volunteerism to the DAS and the many lives that have been touched by your interest in astronomy. Also, special thanks to Bill's wife Grace, for her continual support of his astronomy hobby.

Welcome New Members!

The following folks joined the Denver Astronomical Society during the last few months. Welcome new members!

- | | |
|----------------------|-----------------------|
| • Steve Bailey | • David Polsley |
| • Laurie Budke | • Daniel & Kathi Rake |
| • Alan Cartwright | • Chris Rasmussen |
| • Jim Dare | • Ken R. Shelby, Jr. |
| • Bryce Faulkner | • Earl Staelin |
| • Richard M. Goering | • Greg Wimpey |
| • Lisa Judd | • Leonard Winograd |
| • Michael P. Koenig | • David Wright |
| • Dennis C. Norris | |
| • James F. Oakley | |

Astro-Trivia Answer

A. On its mission to Jupiter, Galileo flew by and extensively photographed two asteroids in the early 1990s. Later analysis of the photos revealed a surprise beyond asteroid 243 Ida? a tiny spherical satellite, the first asteroid moon discovered. Nicknamed Baby Ida, it was given the provisional designation 1993 (243) 1 (1993 for the year of discovery, 243 after Ida, and 1 as the first asteroid moon observed). Baby Ida was later given its permanent name, Dactyl, after mythical beings called ?Dactyli? who lived on Mount Ida with Zeus.

Directions to the E.G. Kline Dark Site

The DAS Edmond G. Kline Dark Site is about 60 miles east of the "mouse-trap" in downtown Denver.

Take I-70 east to the Deer Trail exit (exit 328), turn left at the end of the exit ramp, and turn left again on CR 217 (after the Texaco station). Take CR 217 just over 1/2 mile, and turn right (east) onto CR 34. Stay on CR 34 about 6 miles until you get to CR 241. Turn left (north) onto CR 241 and continue about 1.5 miles - you'll see a culvert with a wide gate on the right (east) side of the road.

Directions to the site from Denver, arrival from the North (for after-dark arrivals):

Take I-70 eastbound to exit 316 (Byers). Turn left at end of ramp which puts you on eastbound US-36. Take US-36 east 17.2 miles to CR 241. Turn right (south) onto CR 241 and continue for 6.2 miles. The DSS entrance is on the left between two tall posts.

Note: Travel distance from Denver using the North route is actually 3.9 miles shorter than the traditional route. The first 5 miles of CR 241 going south from US-36 is narrow and somewhat rough. Be careful.

Warming Hut Rules

- The last people on the site must turn off the lights and the heat.
- A microwave will be provided for warming food. Please clean up after yourself.
- No pots and pans, appliances, or other supplies are to be left in the shed.
- No personal supplies are to be left in the shed overnight.
- Do not donate furniture or other things unless you clear it with the D.S.S. committee first.
- No food left overnight in the shed.
- No sleeping overnight in the shed.
- Quick naps are permitted if you feel you might fall asleep on the way home. We would prefer you get your nap rather than falling asleep on the road. However, we don't want it to become a tent for camping.
- Clean up after yourself before you leave the site.
- Please clean up all food that drops or is spilled, otherwise it will attract mice and insects.

o b s e r v e r s d e c k

A Perfect Storm?

Continued from page 1

astronomy doesn't get any better or cheaper than this! Meteors will be coming from an area near the head of Leo, high in the southeast, but will be seen all over the sky.

On the morning of Nov. 19 the Earth will pass through a couple of debris trails left in space by a comet hundreds of years ago. Over the past few years we have seen two major showers as Earth passed through parts of the trails. This year is the last time our paths will cross in space for many many years. In past years North America got the "tail-end" of the trails with the lesser of the two, but we still saw hundreds per hour last year. This year N. America is favored, as the Earth rotates into the oncoming stream, by the greater mass of comet debris. But, (there always seems to be a "but"), the nearly full moon will be up at the same time. This means we won't see as many as we could have, but predictions are that we will still see many hundreds or even thousands per hour. So, starting about 2-3 A.M. on Tues. Nov. 19, find your way out of city lights and perhaps a place where the moon will be behind a mountain, forest or hills, and enjoy the spectacle. Take your kids or grandkids, it will be something they can pass on to their grandkids to watch for in the next century.

For details about the predictions and peak times go to: <http://science.nasa.gov/headlines/y2002/images/leonidsforecast/Denver.gif>

Positions of Moon: (Moon @ magnitude -11.9)		
TIME	ALTITUDE	AZIMUTH
2 A.M.	47	247
3 A.M.	36	259
3:30 A.M.	30	265
4 A.M.	24	270 (due west)
4:40 A.M.	07	284 (tail of predicted peaks)

Other relevant data:

- ★ Moonset at 6:24am
- ★ Start of twilight about 6am; astronomical twilight about 5:35am
- ★ Sunrise: 6:52am

Follow local weather forecasts and satellite images to keep up with weather predictions. Remember, the DAS E-board is not responsible for bad weather. It's up to you to find that "sucker hole."

If you go to the DAS Ed Kline Dark Site, please follow all the rules of courtesy listed in this newsletter. It could be very crowded out there and we all need to be extra courteous so as not to spoil a perfect storm for others, by turning on lights or starting cars or lights in the middle of it. Help to make this a perfect storm for your friends and fellow storm chasers.—Ron Pearson

Dark Sky Site Courtesy

Please remember that white light disrupts the eye's dark adaptation and can ruin astrophotography. Following these simple guidelines will improve the experience for all:

- ★ Upon arrival at the site, check to see if sign in has been instituted at the warming hut. We hope this will help alleviate problems members may be experiencing in trying to find a place to set up.
- ★ Drive carefully on the road, there are blind spots in the low area and you will find cattle on the road at times.
- ★ Try to arrive before dark.
- ★ If you have to arrive after dark, turn off headlights when turning into site.
- ★ Turn off all dome and trunk lights. If a light can't be turned off, pull the fuse, use layered red brake light tape or just duct tape over it.
- ★ When you drive in, position your car so you can drive out directly instead of using your back up lights.
- ★ Use only dim red flashlights. Never shine a flashlight in someone's face or on their scope.
- ★ Please wipe your feet carefully before using the warming hut.
- ★ Please chip in and do some cleaning up in the hut or at the observing sites. It is the responsibility of all users to keep the place nice.
- ★ Serious astrophotographers may wish to use the South field since it is somewhat isolated from the rest of the area.
- ★ If you are the last person to leave the site, turn off the lights and the heaters in the warming hut. Then, lock the warming hut and

close the gate to the site.

- ★ Members are responsible for educating their guests as to the rules.
- ★ Prospective members, out of town astronomers, and others may be guests one time.
- ★ Members can bring family any time and personal friends on a limited basis, but should not abuse the privilege.
- ★ Groups of five or more guests must be cleared through the President or Vice President prior to visiting the Dark Sky Site.
- ★ There is no sleeping in the warming shed overnight. However if you need to nap for a short period, you can use the shed. We would rather you fall asleep there rather than at the wheel on the way home.
- ★ You may warm drinks in the microwave—it is not there for warming food and cooking since we have no water to clean up. If you spill, please clean up after yourself

OTHER SUGGESTIONS:

- ★ Wear warm clothing. The nights can be extremely cold in the winter and surprisingly cold in the summer.
- ★ Bring your own power such as a battery and/or an inverter since the power sites are limited. Also bring extension chords.
- ★ Hot drinks can help you survive the night!
- ★ When approaching the telescope of someone who does not know you, introduce yourself and ask before looking through the scope. Most members (with the exception of astrophotographers when they are taking pictures) will be happy to share their scopes.
- ★ Bring your own toilet paper in case that in the porta-potty runs out.

edmund g. kline dark site

About the Denver Astronomical Society

The DAS is a group of amateur and professional astronomers that share a mutual interest in the heavens. The DAS operates the University of Denver's Chamberlin Observatory, along with its prized 1894 Alvan Clark 20-inch refracting telescope. Our members have been involved with the first public planetarium at the Denver Museum of Science and Nature and the Smithsonian Astrophysics Observatory's "Moon Watch" program. The DAS successfully petitioned to have the Chamberlin Observatory listed on the National Register of Historic Places.

Our Credo is to provide members a forum for increasing and sharing their knowledge, to promote and educate the public about astronomy, and to preserve the historic telescope and observatory in cooperation with the University of Denver. To these ends we have established three tax deductible funds: the Van Nattan Scholarship Fund, the Chamberlin Restoration Fund, and the DAS Dark Sky Site Fund. This last fund was established in order to construct and maintain observing facilities near Deer Trail in eastern Colorado.

Please call our Info Line at (303) 871-5172 and drop by the General Membership meetings. Become a member and enjoy speakers, facilities, events, and our monthly newsletter, *The Denver Observer*.

**APPLICATION FOR MEMBERSHIP TO THE
DENVER ASTRONOMICAL SOCIETY**

New Renewal

Name: _____
 Address: _____
 City, State, Zip: _____
 Phone numbers: Home () Work ()
 E-mail Address: _____
 Occupation: _____
 Other Interests: _____
 (Associates Only) School: _____ Grade: _____
 Do you want to download the newsletter in PDF format from our website instead of by postal mail?
 Yes No
 Do you want the above information excluded from the yearly roster? Yes No

Please Circle All That Apply:

Regular Membership: \$30 Associate: \$10 (*Age 22 and younger*)
 \$ _____
 Astronomy Magazine/\$29
 Sky & Telescope Magazine/\$29.95
 \$ _____
 Van Nattan Scholarship Fund \$ _____
 Chamberlin Restoration Fund \$ _____
 Total Amount Paid \$ _____

*Please mail Dark Sky Site donations to: DAS Treasurer, Chuck Carlson, at the address below. (Make checks payable to the Dark Sky Site Fund). Please complete this form, or a copy, and mail it with your check or money order payable to The Denver Astronomical Society:
 DAS Treasurer, Chuck Carlson; 1521 So. Vine St.; Denver, CO 80210*



Denver Astronomical Society

c/o Chamberlin Observatory
 2930 East Warren Avenue
 Denver, Colorado 80208

NOVEMBER'S MEETING

NOVEMBER 22:

Steve Solon (DAS), "*The DAS—Us 'n Stuff*," *and* the *Annual Membership Show & Tell*.

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j o i n u s