

# PrimeFocus


**WHEN:**

February 18, 2022  
Meeting at 7:30pm  
Lecture at 8:00pm

**WHERE:**

Virtual Meeting using Zoom  
See the April 2020 issue of  
PrimeFocus for info on  
getting connected using  
Zoom

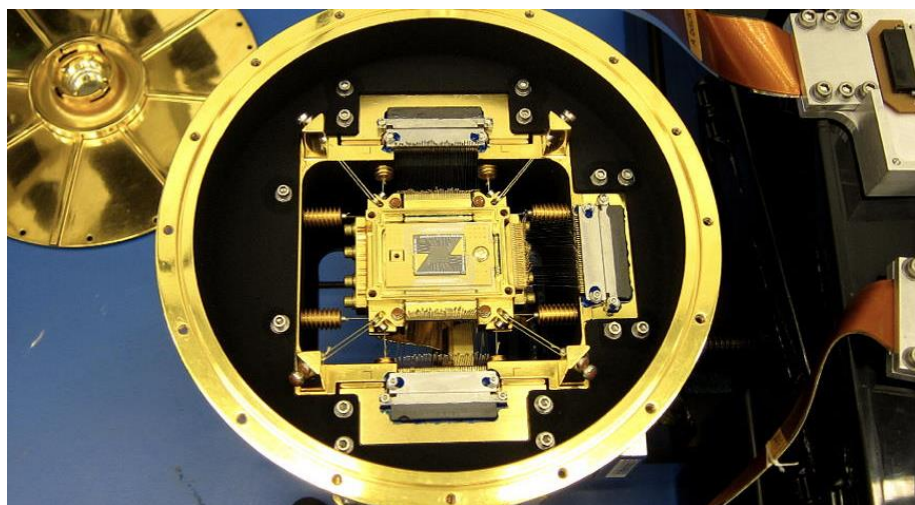
**TVS QR Code**

**INSIDE THIS ISSUE:**

News and Notes	2
Calendar of Events	2
TVS Astrophotos	4-5
What's Up	6
NASA Night Sky Notes	7
Membership/Renewal Application	8

## X-ray Astrophysics Enabled by Microcalorimeter Spectrometers Dr. Megan Eckart, Lawrence Livermore National Laboratory

X-rays from astrophysical objects provide a view into some of nature's most violent and extreme environments. Telescopes sensitive to 0.1–100 keV photons provide unique probes of accreting black holes and the warped spacetime around them, clusters of galaxies—the Universe's most massive gravitational potential wells, the growth and evolution of galaxies, and much more. The coming generation of astrophysical x-ray missions will deploy arrays of x-ray microcalorimeters. These detectors enable a powerful combination of high spectral resolution and high quantum efficiency over a broad energy range (0.1–12 keV). In this talk I will review the motivation for observing the universe in the x-ray waveband and highlight the major differences in approach for x-ray observations compared to optical observations, describe the microcalorimeter detector concept and the underlying superconducting sensors, and touch on the space missions that will carry microcalorimeter-based instruments in the years and decades to come.



Caption: The X-ray Imaging and Spectroscopy Mission (XRISM) is a JAXA/NASA collaborative mission, with ESA participation, with the objective to investigate X-ray celestial objects in the Universe with high-throughput, high-resolution spectroscopy. Hitomi SXS Calorimeter insert with detector installed. See: <https://heasarc.gsfc.nasa.gov/docs/xrism/about/index.html>

Megan joined Lawrence Livermore National Laboratory's Physics Division in 2018 and works on research and space-flight projects within the Astrophysics and Advanced Diagnostics group. She is a member of the microcalorimeter instrument teams for the joint JAXA-NASA XRISM mission and the ESA-led Athena X-ray observatory and leads research projects aimed at adapting microcalorimeter spectrometers for use with magnetic fusion energy devices. Prior to working at LLNL, Megan worked at NASA Goddard Space Flight Center from 2007 to 2018. Her thesis work at Caltech involved the development of microwave kinetic inductance detectors for x-ray astrophysics and measurements of x-ray selected active galactic nuclei.

# News and Notes

## 2022 Meeting Dates

Lecture Meeting	Board Meeting	PrimeFocus Deadline
Feb. 18	Feb. 21	
Mar. 18	Mar. 21	Mar. 4
Apr. 15	Apr. 18	Apr. 1
May 20	May 23	May 6
Jun. 17	Jun. 20	Jun. 3
Jul. 15	Jul. 18	Jul. 1
Aug. 19	Aug. 22	Aug. 5
Sep. 16	Sep. 19	Sep. 2
Oct. 21	Oct. 24	Oct. 7
Nov. 18	Nov. 21	Nov. 4
Dec. 16	Dec. 19	Dec. 2

## Money Matters

As of the last Treasurer's Report on 01/24/22, our club's account balance is \$67,017.09. This includes \$43,104.14 in the H2O Rebuild fund.

## TVS Welcomes New Members

TVS welcomes new members Connie Parchman, Michael Clive, and Lauren and Todd Bryant. Please say hello and chat with them during our Zoom meetings.

## Time to Renew Club Membership for 2022

Now is a great time to become part of TVS. Membership is open to anyone with an interest in astronomy. Amateurs and professionals are equally welcome; skilled amateurs comprise the majority of the membership. You do not have to own a telescope in order to be a member.

Those renewing their club membership are encouraged to do so by using the online application before the end of December. Normally our memberships are only good for the calendar year, but anyone joining after October 1st will be given a membership for the remainder of 2021 and all of 2022.

The regular club membership remains a bargain at \$30. Student membership (full-time High School or College student) is only \$10! To become a key holder to H2O, you must be 18 or older. There is a one-time \$20 Key deposit and a \$10 annual access fee.

You can join TVS or renew your membership online at: <http://www.trivalleystargazers.org/membership.shtml> After filling out the application form you are connected to the PayPal payment form. You do not need to have a PayPal account to pay online, since PayPal will accept credit cards. Everyone is encouraged to use the online application. Alternatively, you can mail in the Membership Application on the last page of this newsletter along with a check to the Tri-Valley Stargazers, P.O. Box 2476, Livermore, CA 94551-2476. Note that TVS will not share your information with anyone. We only use the e-mail address to notify you when the newsletter becomes available.

All members agree to hold the 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

## 2022 Club Star Party Schedule

Save the dates for the 2022 Club Star Parties.

Del Valle star parties are also public outreach events. They are jointly hosted with the EBRPD and held at the Arroyo Staging Area. The public is invited for the first 1.5-2 hours, while club members can stay the remainder of the night.

Tesla Vintners star parties are open to only club members and their guests. These star parties end at midnight, but participants can leave earlier, should they wish.

H2O Open House star parties are open to the public. The open house ends at midnight, and all participants are encouraged to stay the duration. The drive to H2O takes about 1 hour, and the caravan leaves promptly from the corner of Mines and Tesla Rds.

February 16, 5:45pm: Outreach party for 4H group at Arroyo Seco School, 5280 Irene Way, Livermore

March 8, 6:00pm: Outreach party at Live Oak Elementary School, 5151 Sherwood Way, San Ramon

## Barcroft High Altitude Star Party

Reservations for the Eastbay Astronomical Society's Barcroft High-Altitude Star Party are now open to members of both the EAS and Tri-Valley Stargazer's clubs. This year's event will be held from Saturday, August 27 through Friday, September 2nd (with departure by noon of Friday, September 2nd). That's six nights. Space at Barcroft is limited to a maximum of 12 people per day, so to ensure you get the days you want, make your reservations early.

Before sending payments for reservations (\$65 per night, per person), even if you've been there before, please contact Don Saito FIRST ([barcroft@eastbayastro.org](mailto:barcroft@eastbayastro.org)) to ensure the dates you wish to attend are available. You will also be asked to read the [Barcroft Writeup](#), as it provides the information you'll need to have a safe, comfortable stay, and what is expected of guests to this University of California research facility.

For more details on making a reservation, see:

<https://eastbayastro.org/events/>

# Calendar of Events

## February 15, 6:00pm

What: Journey to a Metal World

Who: Prof. David Williams, Arizona State University

# Calendar of Events (con't)

Sponsor: NASA Night Sky Network  
Online: [https://youtu.be/qJX4TC\\_sul](https://youtu.be/qJX4TC_sul)

Asteroid (16) Psyche is the largest M-type (metal-dominated) asteroid in the Solar System, and has never been explored by spacecraft. The Psyche mission is preparing to launch in August 2022 – what will it find? Please join Professor David Williams of ASU's School of Earth and Space Exploration, and a Psyche Mission Co-I and Deputy Imager Lead, to discuss the details of the Psyche Mission and what it may find as it explores this metal world.

For more information, see:  
[https://nightsky.jpl.nasa.gov/news-display.cfm?News\\_ID=707](https://nightsky.jpl.nasa.gov/news-display.cfm?News_ID=707)

## February 17, 9:00pm-10:30pm

What: Virtual Telescope Viewing  
Who: Chabot Staff  
Sponsor: Chabot Space and Science Center  
Online: <https://www.youtube.com/c/ChabotSpace>

Join our resident astronomers on Facebook Live and YouTube every Saturday evening live from Chabot's Observation deck!

Each week, our astronomers will guide us through spectacular night sky viewing through Nellie, Chabot's most powerful telescope. Weather permitting, we will be able to view objects live through the telescopes and our astronomers will be available to answer your most pressing astronomy questions.

Nellie is a 36-inch reflector telescope, housed in a rolling roof observatory that allows access to 180 degrees of sky. This

modern, research-quality telescope offers breathtaking views of the cosmos.

For more information, see:  
<https://chabotspace.org/events/events-listing/>

## February 18, 19, 25, 26, March 4, 5, 11, 12, 7:30pm-10:30pm

What: Free Telescope Viewing  
Who: Chabot Staff  
Where: Chabot Space and Science Center, 10000 Skyline Blvd. Oakland, CA 94619  
Cost: Free

Join Chabot astronomers on the Observatory Deck for a free telescope viewing! Weather permitting, this is a chance to explore stars, planets and more through Chabot's historic telescopes. Chabot's three large historic telescopes offer a unique way to experience the awe and wonder of the Universe. Our observatory deck offers breathtaking views 1,500 feet above the Bay. Three observatory domes house the Center's 8-inch (Leah, 1883) and 20-inch (Rachel, 1916) refracting telescopes, along with a 36-inch reflecting telescope (Nellie, 2003).

For COVID-19 Restrictions, see:  
<https://chabotspace.org/visit/plan-your-visit/>

For more information, see:  
<https://chabotspace.org/events/events-listing/>

continued on p.4

### **Officers**

#### **President**

Ron Kane  
[president@trivalleystargazers.org](mailto:president@trivalleystargazers.org)

#### **Vice-President**

Eric Dueltgen  
[vice\\_president@trivalleystargazers.org](mailto:vice_president@trivalleystargazers.org)

#### **Treasurer**

John Forrest  
[treasurer@trivalleystargazers.org](mailto:treasurer@trivalleystargazers.org)

#### **Secretary**

Ross Gaunt  
[secretary@trivalleystargazers.org](mailto:secretary@trivalleystargazers.org)

#### **Past President**

Roland Albers  
[past\\_president@trivalleystargazers.org](mailto:past_president@trivalleystargazers.org)

### **Volunteer Positions**

#### **Astronomical League Rep.**

Dennis Beckley  
[alrep@trivalleystargazers.org](mailto:alrep@trivalleystargazers.org)

#### **Club Star Party Coordinator**

Eric Dueltgen  
[coordinator@trivalleystargazers.org](mailto:coordinator@trivalleystargazers.org)

#### **Del Valle Coordinator**

David Wright  
[delvalle@trivalleystargazers.org](mailto:delvalle@trivalleystargazers.org)

#### **Historian**

Hilary Jones  
[historian@trivalleystargazers.org](mailto:historian@trivalleystargazers.org)

#### **Librarian**

Ron Kane  
[librarian@trivalleystargazers.org](mailto:librarian@trivalleystargazers.org)

#### **Loaner Scope Manager**

Ron Kane  
[telescopes@trivalleystargazers.org](mailto:telescopes@trivalleystargazers.org)

#### **Newsletter Editor**

Ken Sperber  
[newsletter@trivalleystargazers.org](mailto:newsletter@trivalleystargazers.org)

### **Night Sky Network Rep.**

Ross Gaunt  
[nnsn@trivalleystargazers.org](mailto:nnsn@trivalleystargazers.org)

### **Observatory Director/Rebuild Chairman**

Chuck Grant  
[observatory@trivalleystargazers.org](mailto:observatory@trivalleystargazers.org)

### **Observing Program Coordinator**

Ron Kane  
[awards@trivalleystargazers.org](mailto:awards@trivalleystargazers.org)

### **Outreach Coordinator**

Eric Dueltgen  
[outreach@trivalleystargazers.org](mailto:outreach@trivalleystargazers.org)

### **Potluck Coordinator**

**OPEN**  
[potluck@trivalleystargazers.org](mailto:potluck@trivalleystargazers.org)

### **Program Coordinator**

Dan Helmer  
[programs@trivalleystargazers.org](mailto:programs@trivalleystargazers.org)

### **Publicity and Fundraising**

**OPEN**  
[publicity@trivalleystargazers.org](mailto:publicity@trivalleystargazers.org)

### **Refreshment Coordinator**

**OPEN**

### **Webmaster**

Hilary Jones  
[webmaster@trivalleystargazers.org](mailto:webmaster@trivalleystargazers.org)

### **Web & E-mail**

[www.trivalleystargazers.org](http://www.trivalleystargazers.org)  
[info@trivalleystargazers.org](mailto:info@trivalleystargazers.org)

### **TVS E-Group**

To join the TVS e-group just send an email message to TVS at: [info@trivalleystargazers.org](mailto:info@trivalleystargazers.org) asking to join the group. Make sure you specify the e-mail address you want to use to read and post to the group.

## TVS Astrophotos: Planetary Nebula Abell 12



Caption: Ron Kane imaged Abell 12 on January 23, 2022. He reports: There's a planetary nebula located about 1 arcmin from the star Mu Orionis, it's easy to locate the star but difficult to see the nebula and was only recognized as a planetary nebula about 1975 (DeepSkyForum). The star Mu Ori is 4 mag and the nebula more like 12 mag and so close to the star that it washes out the nebula. The star is much closer to us than the nebula too.

Abell 12 is in our southern sky when Orion is visible. The star is Orion's right elbow, just "up" from Betelgeuse, and thus an easy star-hop. Our urban sky and the low brightness of Abell 12 makes it a hard object to observe. I used a TVS club 8 inch SCT and took 60 images, each 30s with ISO set to 2500, on my EOS 80D. There's 30 or so Darks in the group as well. DeepSkyStacker was used and my image processing was also limited to DSS. Hey, it's a first show and I was surprised to see what I got!

I'll revisit it again, maybe at H2O and use a barlow too. Try it!

## Calendar of Events (con't)

**March 7, 7:30pm**

What: Are Red Dwarf Planets Habitable?  
Who: Professor Gibor Basri, (UC Berkeley)  
Where: Golden Gate Park, 55 Music Concourse Drive,

San Francisco

Cost: Members and Seniors \$12, Guests \$15

The most common stars in the Universe are red dwarfs. These are small, faint, cool stars that range from one-tenth to one-

continued on p.5

## TVS Astrophotos: NGC2237, The Rosette Nebula



NGC2237 (Rosetta Nebula), 14" SCT Hyperstar F2, 89x5min., 7:25hr, ASI2600MC, 1x1 0C, Jan./Feb. 2022, (c) Gert Gottschalk

Caption: The Rosette Nebula in Monoceros, as imaged by Gert Gottschalk. The nebula NGC2237 is situated around the young star cluster NGC2244 at a distance of 5000 light-years from Earth. The energy from the young stars excites the gas in the nebula to glow in the spectral lines of hydrogen and oxygen which were captured in the image. The narrow spectral lines are filtered from the city light pollution and allow imaging this object from my place in Fremont. The instrument is a Celestron-14 telescope with the 'Hyperstar' prime focus corrector system yielding f/2 optics. A total of 89 exposures of 5min. each were processed in PixInsight and Photoshop to produce the final image.

## Calendar of Events (con't)

half the diameter of the Sun and which have extraordinarily-long lifetimes. Recent surveys have discovered Earth-size planets around several red dwarf stars, including Proxima Centauri (the nearest star to the Sun). What might conditions be like on worlds orbiting such unusual stars, and could any of them be habitable? Have any been identified as "best candidates" to consider as abodes for life?

For more information, see:

<https://www.calacademy.org/events/benjamin-dean-astronomy-lectures/are-red-dwarf-planets-habitable>

# What's Up

By Ken Sperber (adapted from S&T)

All times are Pacific Standard Time until March 13, Pacific Daylight Time thereafter

## February

- 13 Sun The Moon lines up with Castor and Pollux (Evening)
- 16 Wed Full Moon (8:56am)**
- 16 Wed The Moon is  $5^\circ$  from Regulus in the east (Dusk)
- 18- Fri- Over the next 2 weeks, the Zodiacal Light is visible in the west from a dark site (Evening)
- 20 Sun The Moon trails Spica by  $\sim 5.5^\circ$  in the east-southeast (Evening)
- 23 Wed Last-Quarter Moon (2:32pm)**
- 24 Thu The Moon is  $\sim 3^\circ$  left of Antares (Morning)
- 27 Sun The crescent Moon, Mars, and Venus rise in the southeast (Dawn)

## March

- 2 Wed Venus and Mars are separated by  $5^\circ$ , while Mercury and Saturn are  $1^\circ$  apart (Dawn)
- 2 Wed New Moon (9:35am)**
- 3 Thu Algol at minimum brightness for 2 hours centered on 9:17pm
- 8 Tue The Moon, in Taurus, sits in between Aldebaran and The Pleiades (Evening)
- 10 Thu First-Quarter Moon (2:45am)**
- 12 Sat The Moon is  $3^\circ$  from Pollux (Evening)
- 13 Sun Daylight Savings Time begins at 2:00am**
- 15 Tue The Moon is  $4^\circ$  to the upper left of Regulus in the southeast (Evening)
- 18 Fri Full Moon (00:18am)**
- 19 Sat The Moon and Spica, separated by  $4^\circ$ , rise in tandem in east-southeast (Evening)
- 23 Wed The Moon is  $2^\circ$  above of Antares in the south (Dawn)
- 24 Thu Last-Quarter Moon (10:37pm)**
- 25 Fri Venus, Mars, and Saturn form a triangle and rise in the east-southeast (Dawn)
- 26 Sat Algol at minimum brightness for 2 hours centered on 8:51pm
- 28 Mon The crescent Moon, Venus, Mars, and Saturn rise in the east-southeast (Dawn)
- 29 Tue Algol at minimum brightness for 2 hours centered on 8:41pm

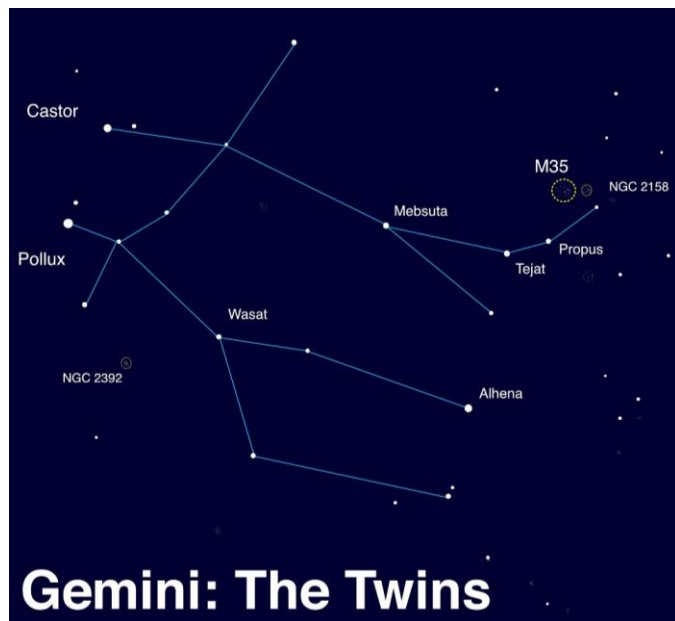


## Hang Out with the Twins of Gemini

By David Prosper

The night skies of February are filled with beautiful star patterns, and so this month we take a closer look at another famous constellation, now rising high in the east after sunset: Gemini, the Twins!

If you're observing Orion, as discussed in last month's article, then Gemini is easy to find: just look above Orion's "head" to find Gemini's "feet." Or, make a line from brilliant blue-white Rigel in the foot of Orion, through its distinct "Belt," and then on through orange Betelgeuse. Keep going and you will end up in between the bright stars Castor and Pollux, the "heads" of the Gemini Twins. While not actually related – these stars aren't bound to each other, and are almost a magnitude apart in brightness – they do pair up nicely when compared to their surrounding stars. Take note: more than one stargazer has confused Gemini with its next-door neighbor constellation, Auriga. The stars of Auriga rise before Gemini's, and its brightest star, Capella, doesn't pair up as strikingly with its second most brilliant star as Castor and Pollux do. Star-hop to Gemini from Orion using the trick above if you aren't sure which constellation you're looking at.

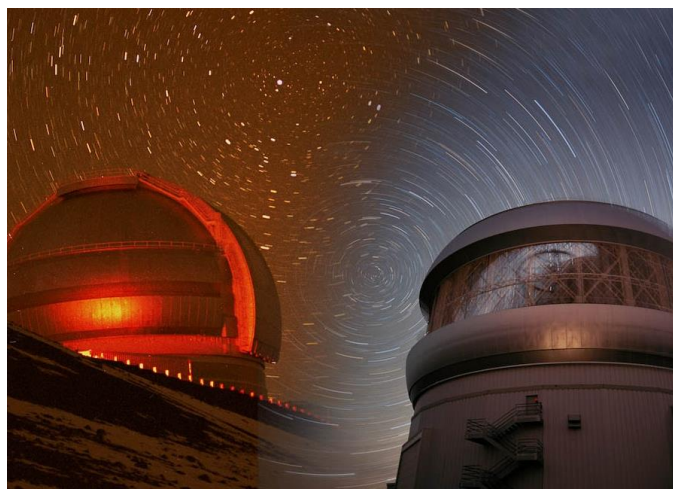


## Gemini: The Twins

Caption: Castor and Pollux are Gemini's most prominent stars, and often referred to as the "heads" of the eponymous twins from Greek myth. In Chinese astronomy, these stars make up two separate patterns: the Vermillion Bird of the South and the White Tiger of the North. What do you see? The Night Sky Network's "Legends in the Sky" activity includes downloadable "Create Your Own Constellation" handouts so you can draw your own star stories: [bit.ly/legendsinthesky](https://bit.ly/legendsinthesky). Image created with assistance from Stellarium.

Pollux is the brighter of Gemini's two "head" stars - imagine it has the head of the "left twin" - and located about 34 light-years away from our Solar System. Pollux even possesses a planet, Pollux b, over twice the mass of Jupiter. Castor - the head of the "right twin" - by contrast, lies about 51 light-years distant and is slightly dimmer. While no planets have been detected, there is still plenty of company as Castor is actually a six-star system! There are several great deep-sky objects to observe as well. You may be able to spot one with your unaided eyes, if you have dark skies and sharp eyes: M35, a large open cluster near the "right foot" of Gemini, about 3,870 light-years away. It's almost the size of a full Moon in our skies! Optical aid like binoculars or a telescope reveals the cluster's brilliant member stars. Once you spot M35, look around to see if you can spot another open cluster, NGC 2158, much smaller and more distant than M35 at 9,000 light-years away. Another notable object is NGC 2392, a planetary nebula created from the remains of a dying star, located about 6,500 light-years distant. You'll want to use a telescope to find this intriguing faint fuzzy, located near the "left hip" star Wasat.

Gemini's stars are referenced quite often in cultures around the world, and even in the history of space exploration. NASA's famed Gemini program took its name from these stars, as do the appropriately named twin Gemini North and South Observatories in Hawaii and Chile. You can discover more about Gemini's namesakes along with the latest observations of its stars and related celestial objects at [nasa.gov](https://nasa.gov)



Caption: Montage of Gemini North, located on Mauna Kea in Hawaii, and Gemini South, located on Cerro Pachón in Chile. These "twin" telescopes work together as the Gemini Observatory to observe the entire sky. Image Credit: NOIRLab Source: <https://www.gemini.edu/gallery/media/gemini-northsouth-montage>

This article is distributed by the NASA Night Sky Network, a coalition of hundreds of astronomy clubs across the US dedicated to astronomy outreach. Visit [nightsky.jpl.nasa.gov](https://nightsky.jpl.nasa.gov) to find local clubs, events, stargazing info and more.



Tri-Valley Stargazers  
P.O. Box 2476  
Livermore, CA 94551  
[www.trivalleystargazers.org](http://www.trivalleystargazers.org)

## Tri-Valley Stargazers Membership Application

### Contact information:

Name: \_\_\_\_\_ Phone: \_\_\_\_\_

Street Address: \_\_\_\_\_

City, State, Zip: \_\_\_\_\_

Email Address: \_\_\_\_\_

Status (select one): \_\_\_\_\_ New member \_\_\_\_\_ Renewing or returning member

**Membership category** (select one): Membership term is for one calendar year, January through December.

\_\_\_\_\_ Student member (\$10). Must be a full-time high-school or college student.

\_\_\_\_\_ Regular member (\$30).

**Hidden Hill Observatory Access** (optional): Must be 18 or older.

\_\_\_\_\_ One-time key deposit (\$20). This is a refundable deposit for a key to H2O. New key holders must first hear an orientation lecture and sign a usage agreement form before using the observing site.

\_\_\_\_\_ Annual access fee (\$10). You must also be a key holder to access the site.

**Donation** (optional):

\_\_\_\_\_ Tax-deductible contribution to Tri-Valley Stargazers

**Total enclosed:** \$ \_\_\_\_\_

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. TVS will not share information with anyone except as detailed in our Privacy Policy (<http://www.trivalleystargazers.org/privacy.shtml>).

Mail this completed form along with a check to: Tri-Valley Stargazers, P.O. Box 2476, Livermore, CA 94551.