



The Newsletter of the Kern Astronomical Society No. 530 November 2019

KAS Open Meeting

***First Friday of
Every Month***

November 1, 2019 @
[Round Table Pizza](#),
4200 Gosford Road,
Suite 101, Bakersfield, CA

Dinner & Social 6:30 pm
Meeting/Program 7:30 pm

[Round Table Pizza](#): You are now able to order online or through the phone prior to arriving to the monthly meeting, by doing so you will receive customer rewards.

<http://www.roundtablepizza.com/rtp/>

[661-397-1111](tel:661-397-1111)

New Members / Membership Renewal

- You can join / renew at our monthly meetings with cash, check, or credit card
- You can join / renew by mail using the form at the bottom of the newsletter

Join us on Facebook: <https://www.facebook.com/groups/syzygy/>

Visit our Web Page at <https://www.KernAstronomical.org>

Contact us at kernastronomical@gmail.com



Reach for the Stars



This Month's Events

2019 NOVEMBER

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1 	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

- Nov 1st – Monthly Meeting at Round Table Pizza
- Nov 19th – Board Meeting at Doubletree
- Nov 23rd – Last Quarter Moon Star Party at Chuchupate
- Dec 6th – Annual Christmas Party

Upcoming Programs – Fall 2019 / Winter 2020

2019

- November 1st – Carlos Ortega – Distance to the Moon
- December 6th – Annual Christmas Party

2020

- January 3rd – Tim Elam – San Andreas Fault
- February 7th – Terry Himes – Climate Change
- March 6th – Angela Dorsey – Atomic Clock

Kern Astronomical Society Public Outreach

International Observe the Moon Night at Barnes & Noble



Panorama Vista Fall Science Camps – Solar Observing



Munsey Elementary



El Tejon Unified



Popular Autumn Objects

by Walter Albrecht

Autumn has officially arrived and new sky objects can be observed. The weather has started to cool and there is a good chance we will have some clear nights until the winter weather arrives.

Our first object is the Andromeda Galaxy, otherwise known as M31. It is probably the most famous galaxy outside of the Milky Way Galaxy. It was discovered centuries before the invention of the telescope as it is a naked eye object in dark skies. Early astronomers thought it was a nearby nebula but the 100 inch telescope at Mt. Wilson resolved individual stars thus establishing the existence of other galaxies outside our own. In a 6 inch telescope you will see a fuzzy patch of light. It can be found near the great square of Pegasus.



Our next object is the double star Gamma Andromedae otherwise known as Almach. This double star is 260 light years from Earth. One star is orange and the other star is blue. The blue star is much hotter than the orange star and is actually three stars orbiting each other. Almach is in the constellation Andromeda. A challenge would be to see if you can see two components of the blue star



Our final object is the double cluster in Perseus. The double cluster is actually two open clusters of stars that are near each other. A low power eyepiece in a telescope will give you a good view. You can also see the double cluster in a pair of binoculars. It is possible to see them with your naked eye in a dark sky location. They are 7,400 light years from Earth.



Bibliography:

Watson, Brent. (1995). Finder Charts of Bright Telescopic Objects
Mallas, John H., Kreimer, Evered. (1978). The Messier Album Houston

Sequoia Dark Sky Festival 2020

The 2020 dates for Sequoia Dark Sky are September 11th – 13th. Book early if you plan to stay at the lodge.



Summer Milky Way at Sequoia Dark Sky: by Walter Albrecht

KAS Astrophotography



Cat's Eye Nebula (NGC 6543): by Kyle Druey



Taurus Molecular Cloud: by Mark Zaslove

The Evening Sky Map

FREE* EACH MONTH FOR YOU TO EXPLORE, LEARN & ENJOY THE NIGHT SKY

**NORTHERN HEMISPHERE
NOVEMBER 2019**

Sky Calendar – November 2019

Get Sky Calendar on Twitter
<http://twitter.com/skymaps>

- 2 Moon near Saturn (evening sky) at 8h UT. Mag. 0.6. Occ. Auckland, NZ.
- 4 First Quarter Moon at 10:22 UT.
- 7 Moon at apogee (farthest from Earth) at 9h UT (distance 405,058 km; angular size 29.5').
- 10 Venus 3.9° N of Antares (23° from Sun, evening sky) at 1h UT. Mags. -3.9 and 1.0.
- 10 Mars 2.8° NNE of Spica (24° from Sun, morning sky) at 9h UT. Mags. 1.8 and 1.0.
- 11 Transit of Mercury across the Sun. **WARNING: NEVER LOOK AT THE SUN** — it will instantly damage your eyes. Observers require a safe Sun filter attached securely to the front of their telescope to safely observe Mercury's tiny disk pass in front of the Sun. The event will be visible from most of Earth except central and eastern Asia, Japan, Indonesia and Australia. Transit begins at 12:35 UT; mid-transit at 15:20 UT; ends at 18:04 UT. The next transit of Mercury will occur on November 13 2032.
- 12 Full Moon at 13:36 UT.
- 13 Moon near the Pleiades (morning sky) at 11h UT.
- 17 Leonid meteor shower peaks at 23h UT. Arises from debris ejected by Comet Tempel-Tuttle. Produces very fast meteors (71 km/sec). Expect 10-15 meteors per hour under dark skies. Moonlight will interfere.
- 19 Last Quarter Moon at 21:12 UT.
- 23 Moon at perigee (closest to Earth) at 7:42 UT (366,716 km; angular size 32.6').
- 24 Venus 1.4° S of Jupiter (26° from Sun, evening sky) at 13h UT. Mags. -3.9 and -1.8.
- 26 New Moon at 15:07 UT. Start of lunation 1199.
- 28 Mercury at greatest elongation west (20° from Sun, morning sky) at 10h UT. Mag. -0.5.
- 28 Moon, Venus and Jupiter within a circle of diameter 4.3° (25° from Sun, evening sky) at 12h UT. Mags. -3.9 and -1.8.
- 28 Moon near Venus (27° from Sun, evening sky) at 20h UT. Mag. -3.9.
- 29 Moon near Saturn (evening sky) at 22h UT. Mag. 0.6.

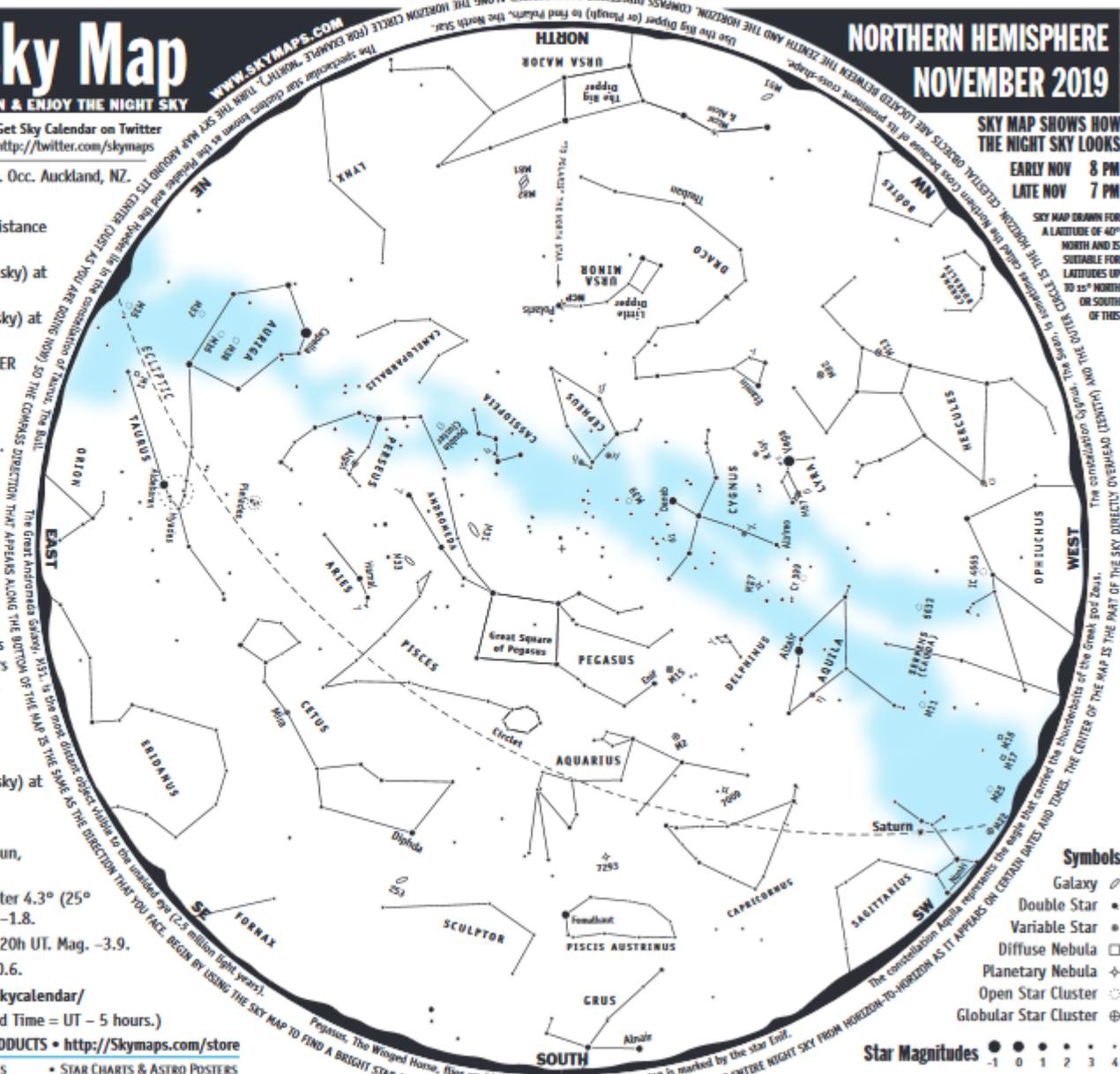
More sky events and links at <http://Skymaps.com/skycalendar/>

All times in Universal Time (UT). (USA Eastern Standard Time = UT - 5 hours.)



SAVE ON RECOMMENDED PRODUCTS • <http://Skymaps.com/store>

- STAR ATLASES & PLANISPHERES
 - STAR CHARTS & ASTRO POSTERS
 - BOOKS FOR SKY WATCHERS
 - TELESCOPES & BINOCULARS
- All sales support the production and free distribution of The Evening Sky Map.



SKY MAP SHOWS HOW THE NIGHT SKY LOOKS

EARLY NOV 8 PM
LATE NOV 7 PM

SKY MAP DRAWN FOR A LATITUDE OF 40° NORTH AND IS SUITABLE FOR LATITUDES UP TO 15° NORTH OR SOUTH OF THIS

Symbols

- Galaxy
- Double Star
- Variable Star
- Diffuse Nebula
- Planetary Nebula
- Open Star Cluster
- Globular Star Cluster

Star Magnitudes -1 0 1 2 3 4

Copyright © 2000–2019 Kym Thalassoudis. All Rights Reserved.

* TERMS OF USE: FREE FOR NON-COMMERCIAL EDUCATIONAL USE. ASTRONOMY EDUCATION GROUPS MAY FREELY DISTRIBUTE PRINTED HANDBOOKS. FULL DETAILS AT <http://skymaps.com/terms.html>

About the Celestial Objects

Listed on this page are several of the brighter, more interesting celestial objects visible in the evening sky this month (refer to the monthly sky map). The objects are grouped into three categories. Those that can be easily seen with the naked eye (that is, without optical aid), those easily seen with binoculars, and those requiring a telescope to be appreciated. **Note, all of the objects (except single stars) will appear more impressive when viewed through a telescope or very large binoculars.** They are grouped in this way to highlight objects that can be seen using the optical equipment that may be available to the star gazer.

Tips for Observing the Night Sky

When observing the night sky, and in particular deep-sky objects such as star clusters, nebulae, and galaxies, it's always best to observe from a dark location. Avoid direct light from street lights and other sources. If possible observe from a dark location away from the light pollution that surrounds many of today's large cities.

You will see more stars after your eyes adapt to the darkness—usually about 10 to 20 minutes after you go outside. Also, if you need to use a torch to view the sky map, cover the light bulb with red cellophane. This will preserve your dark vision.

Finally, even though the Moon is one of the most stunning objects to view through a telescope, its light is so bright that it brightens the sky and makes many of the fainter objects very difficult to see. So try to observe the evening sky on moonless nights around either New Moon or Last Quarter.

Astronomical Glossary

Conjunction – An alignment of two celestial bodies such that they present the least angular separation as viewed from Earth.

Constellation – A defined area of the sky containing a star pattern.

Diffuse Nebula – A cloud of gas illuminated by nearby stars.

Double Star – Two stars that appear close to each other in the sky; either linked by gravity so that they orbit each other (binary star) or lying at different distances from Earth (optical double). Apparent separation of stars is given in seconds of arc (").

Ecliptic – The path of the Sun's center on the celestial sphere as seen from Earth.

Elongation – The angular separation of two celestial bodies. For Mercury and Venus the greatest elongation occurs when they are at their most angular distance from the Sun as viewed from Earth.

Galaxy – A mass of up to several billion stars held together by gravity.

Globular Star Cluster – A ball-shaped group of several thousand old stars.

Light Year (ly) – The distance a beam of light travels at 300,000 km/sec in one year.

Magnitude – The brightness of a celestial object as it appears in the sky.

Open Star Cluster – A group of tens or hundreds of relatively young stars.

Opposition – When a celestial body is opposite the Sun in the sky.

Planetary Nebula – The remnants of a shell of gas blown off by a star.

Universal Time (UT) – A time system used by astronomers. Also known as Greenwich Mean Time. USA Eastern Standard Time (for example, New York) is 5 hours behind UT.

Variable Star – A star that changes brightness over a period of time.

NORTHERN HEMISPHERE
NOVEMBER 2019

CELESTIAL OBJECTS

Sky maps.com

Easily Seen with the Naked Eye

Altair	Aql	• Brightest star in Aquila. Name means "the flying eagle". Dist-16.7 ly.
Capella	Aur	• The 6th brightest star. Appears yellowish in color. Spectroscopic binary. Dist-42 ly.
δ Cephei	Cep	• Cepheid prototype. Mag varies between 3.5 & 4.4 over 5.366 days. Mag 6 companion.
Deneb	Cyg	• Brightest star in Cygnus. One of the greatest known supergiants. Dist-1,400±200 ly.
α Herculis	Her	• Semi-regular variable. Magnitude varies between 3.1 & 3.9 over 90 days. Mag 5.4 companion.
Vega	Lyr	• The 5th brightest star in the sky. A blue-white star. Dist-25.0 ly.
Algol	Per	• Famous eclipsing binary star. Magnitude varies between 2.1 & 3.4 over 2.867 days.
Fomalhaut	PsA	• Brightest star in Piscis Austrinus. In Arabic the "fish's mouth". Dist-25 ly.
Pleiades	Tau	• The Seven Sisters. Spectacular cluster. Many more stars visible in binoculars. Dist-399 ly.
Hyades	Tau	• Large V-shaped star cluster. Binoculars reveal many more stars. Dist-152 ly.
Aldebaran	Tau	• Brightest star in Taurus. It is not associated with the Hyades star cluster. Dist-66.7 ly.
Polaris	UMi	• The North Pole Star. A telescope reveals an unrelated mag 8 companion star. Dist-433 ly.

Easily Seen with Binoculars

M31	And	• The Andromeda Galaxy. Most distant object visible to naked eye. Dist-2.5 million ly.
M2	Aqr	• Resembles a fuzzy star in binoculars.
η Aquilae	Aql	• Bright Cepheid variable. Mag varies between 3.6 & 4.5 over 7.166 days. Dist-1,200 ly.
M38	Aur	• Stars appear arranged in "pi" or cross shape. Dist-4,300 ly.
M36	Aur	• About half size of M38. Located in rich Milky Way star field. Dist-4,100 ly.
M37	Aur	• Very fine star cluster. Discovered by Messier in 1764. Dist-4,400 ly.
μ Cephei	Cep	• Herschel's Garnet Star. One of the reddest stars. Mag 3.4 to 5.1 over 730 days.
Mira	Cet	• Famous long period variable star. Mag varies between 3.0 & 10.1 over 332 days.
γ Cygni	Cyg	• Long period pulsating red giant. Magnitude varies between 3.3 & 14.2 over 407 days.
M39	Cyg	• May be visible to the naked eye under good conditions. Dist-900 ly.
ν Draconis	Dra	• Wide pair of white stars. One of the finest binocular pairs in the sky. Dist-100 ly.
M13	Her	• Best globular in northern skies. Discovered by Halley in 1714. Dist-23,000 ly.
M92	Her	• Fainter and smaller than M13. Use a telescope to resolve its stars.
ε Lyrae	Lyr	• Famous Double Double. Binoculars show a double star. High power reveals each a double.
R Lyrae	Lyr	• Semi-regular variable. Magnitude varies between 3.9 & 5.0 over 46.0 days.
IC 4665	Oph	• Large, scattered open cluster. Visible with binoculars.
6633	Oph	• Scattered open cluster. Visible with binoculars.
M15	Peg	• Only globular known to contain a planetary nebula (Mag 14, d-1"). Dist-30,000 ly.
Double Cluster	Per	• Double Cluster in Perseus. NGC 869 & 884. Excellent in binoculars. Dist-7,300 ly.
M25	Sgr	• Bright cluster located about 6 deg N of "teapot's" lid. Dist-1,900 ly.
253	Sct	• Fine, large, cigar-shaped galaxy. Requires dark sky. Member of Sculptor Group.
Mizar & Alcor	UMa	• Good eyesight or binoculars reveals 2 stars. Not a binary. Mizar has a mag 4 companion.
Cr 399	Vul	• Coathanger asterism or "Brooch's Cluster". Not a true star cluster. Dist-218 to 1,140 ly.

Telescopic Objects

γ Andromedae	And	• Attractive double star. Bright orange star with mag 5 blue companion. Sep-9.8".
7009	Aqr	• Saturn Nebula. Requires 8-inch telescope to see Saturn-like appendages.
7293	Aqr	• Helix Nebula. Spans nearly 1/4 deg. Requires dark sky. Dist-300 ly.
γ Arietis	Ari	• Impressive looking double blue-white star. Visible in a small telescope. Sep-7.8".
η Cassiopeiae	Cas	• Yellow star mag 3.4 & orange star mag 7.5. Dist-19 ly. Orbit-480 years. Sep-12".
Albireo	Cyg	• Beautiful double star. Contrasting colours of orange and blue-green. Sep-34.4".
61 Cygni	Cyg	• Attractive double star. Mags 5.2 & 6.1 orange dwarfs. Dist-11.4 ly. Sep-28.4".
γ Delphini	Del	• Appear yellow & white. Mags 4.3 & 5.2. Dist-100 ly. Struve 2725 double in same field.
β Lyrae	Lyr	• Eclipsing binary. Mag varies between 3.3 & 4.3 over 12.940 days. Fainter mag 7.2 blue star.
M57	Lyr	• Ring Nebula. Magnificent object. Smoke-ring shape. Dist-4,100 ly.
M17	Sgr	• Omega Nebula. Contains the star cluster NGC 6618. Dist-4,900 ly.
M11	Sct	• Wild Duck Cluster. Resembles a globular through binoculars. V-shaped. Dist-5,600 ly.
M16	Ser	• Eagle Nebula. Requires a telescope of large aperture. Dist-8,150 ly.
M1	Tau	• Crab Nebula. Remnant from supernova which was visible in 1054. Dist-6,500 ly.
M33	Tri	• Fine face-on spiral galaxy. Requires a large aperture telescope. Dist-2.3 million ly.
M81	UMa	• Beautiful spiral galaxy visible with binoculars. Easy to see in a telescope.
M82	UMa	• Close to M81 but much fainter and smaller.
M27	Vul	• Dumbbell Nebula. Large, twin-lobed shape. Most spectacular planetary. Dist-975 ly.

The Evening Sky Map (ISSN 1839-7735) Copyright © 2000-2019 Rym Thallasoudis. All Rights Reserved.

Introducing the KAS Sky Patrol Program

by Walter Albrecht



The KAS Sky Patrol is a program that will provide many activities to introduce KAS members to the exciting world of amateur astronomy. In order to complete the program you will need a copy of the sky patrol workbook. Workbooks will be available at our monthly meetings. There are two levels in the KAS Sky Patrol program. Level one has activities that can be completed in the city or suburbs. Level two activities will probably need to be completed in a dark sky location. Members are eligible to receive pins for completing the requisite number of activities in each level.

The KAS Sky Patrol can be completed by any KAS club member. Just complete at least 5 activities from level one and you will receive a pin. Complete at least 5 observations from level two and you can receive a second pin.

Many tasks are inspired by the Sky Puppies Observing Club from the Astronomical League. Should a child under the age of 11 wish to tackle the Sky Puppies Observing Club they will need to go online to the Astronomical League website for further information. The Astronomical League will issue a pin if you complete their Sky Puppies program. Remember that all KAS members are also members of the Astronomical League. Please see a KAS board member for further information.

Please note that the KAS Sky Patrol is a great family project and parents are encouraged to help their children complete the various tasks. Some of the projects can be developed into science fair or STEM fair projects.

For more information on the Astronomical League: <https://www.astroleague.org/>

Kern Astronomical Society InfoShare

Since 1956, the Kern Astronomical Society has promoted community awareness of current events in astronomy, and provides a forum for sharing of knowledge and experiences among amateur astronomers. Annual membership is \$25.00 which also provides membership in the Amateur Astronomical League, access to their newsletter (Reflector Magazine), and participation in observational programs.

Star Parties and Outreach

The Kern Astronomical Society typically has two Club Star Parties each month depending on the weather. Our Club Parties are held on Saturdays nearest the New Moon. We also host Public Star Parties at various locations around town during April - October. These parties are held on Saturdays nearest the first quarter Moon. In addition, we also host Lunar, Solar, and Planetary viewing for Public Schools. Requests may be directed to our Star Party Coordinator.

Club Equipment

The Kern Astronomical Society has telescopes and accessories (listed below) available for loan to Club Members in good standing. Members are encouraged to borrow the different types of telescopes in stock (especially if you are considering purchasing one). Trying out different sizes and types of telescopes can help you make an informed decision about purchases. If you have a Club telescope in your possession, you will be expected to participate in at least one public star party.

- 6" f/6, 8" f/6, 10" f/5.6, 13" f/4.5 Dobsonian telescopes, Parks Jovian 90, 3 ½" f/13 Maksukov-Cassegrain, 4" f/15 Unitron Refractor
- 8" Solar Filter
- Assorted eyepieces

KAS Board Members

President:	Gregg Pytlak	ggpytlak@yahoo.com
Vice President:	Diane Franco	dianef02@yahoo.com
Treasurer:	Mary Hanel	hanel1125@att.net
Secretary:	Angel Gil	angel.gil3021@email.bakersfieldcollege.edu
Star Party Coordinator:	Darren Bly	dcbly@bak.rr.com
Star Party Coordinator:	Darren Bly	dcbly@bak.rr.com
Educational Committee Chair	Walter Albrecht	melchior1472@gmail.com
Educational Youth Ambassador	Claire Im	claire2133@gmail.com
Newsletter Editor	Timothy Stoner	desert_enduro@hotmail.com

Kern Astronomical Society

Membership New/Renewal March 2019/2020

Date: _____

Name: _____

Family Members: _____

Address: _____

City, State, Zip: _____

Phone: _____

Email:* _____

My check# _____ for (or cash) the amount of \$ _____ is enclosed.

(Check box)

Yearly Membership \$25 March 2019 – March 2020

Make checks payable to: KAS (or) Kern Astronomical Society

You can also mail form and check to:

KAS
5501 Stockdale Hwy #10241
Bakersfield, CA 93389

** Please provide the email address where you wish to receive the KAS newsletter (if different than above)

“SYZYGY”: _____