



# AU AstroNews

## The Newsletter of the Astronomical Unit

September 2019

Sponsored by the Santa Barbara Museum of Natural History



The public gathers for a star-spangled outreach at the Ritz-Carlton Bacara on July 4th. Photo credit: Andre Yew.

### SEPTEMBER GENERAL MEETING

Our September 6, 2019 1st Friday meeting will be a presentation by Leon Balents, UCSB Theoretical Physicist and Permanent Member at the KITP (Kavli Institute for Theoretical Physics). His research group studies how many quantum particles interact with one another to collectively produce "emergent" phenomena.

### OUTREACH SUMMARY

Since the last report, AU volunteers Brandy Ackerman, Winslow Barnwood, Tim Crawford, Joe Doyle, John Edkins, Mike Farris, Tessa Flanagan & Duff Kennedy, Ruben Gutierrez, Art Harris, Jürgen Hilmer, Sean Kelly, Ken Kihlstrom, Chris Larson, Pat & Chuck McPartlin, Janet & Martin Meza, Bonnie & Bruce Murdock, Edgar Ocampo, Peggy O'Rork, Gus Pravia, Celeste & Gustavo Ritterstein, Javier Rivera, Diane & Russell Ruiz, David Salvia, Tom Totton, Tom Whittemore, Pat Forgey & Jerry Wilson, and Andre Yew showed cool astronomy stuff to 3257 visitors.

### SEPTEMBER OUTREACH EVENTS

Here are the AU events scheduled so far for September. Events are subject to change, so to get the latest information on schedules, or directions,

just contact Chuck at 964-8201 or [macpuzl@west.net](mailto:macpuzl@west.net)

The Telescope Workshop meets most Tuesday evenings at 7:30 PM at the Broder Building at SBMNH. Contact Tim Crawford at [tcrawf3@cox.net](mailto:tcrawf3@cox.net) for information. Listen to the AU on the radio at KZSB 1290 AM at 9 AM on the second and fourth Monday of each month. Here are the events scheduled so far for the month. Don't forget our annual campout and dinner at the Mohawk Shores group site at Cachuma Lake on the weekend of September 27-29.

#### THURSDAY, SEPTEMBER 5, SETUP 7 PM

Telescopes for the Ritz-Carlton Bacara. We set up on the bluff lawn next to the Angel Oak restaurant.

#### FRIDAY, SEPTEMBER 6, 7 PM

Monthly AU meeting in Farrand Hall at SBMNH. See a quick planetarium show, then hear about emergent quantum properties.

#### SATURDAY, SEPTEMBER 7, SETUP 8 PM

Slide show and telescopes for campers at Cachuma Lake Campground. We set up on the open field at Dakota Plains.

#### TUESDAY, SEPTEMBER 10, SETUP 7 PM

Telescope Tuesday at the Camino Real Marketplace. We set up in the plaza next to the theater.

#### WEDNESDAY, SEPTEMBER 11, SETUP 8 PM

Slide show and scopes for Carpinteria State Beach. We set up on the sidewalk toward the ocean from the entry kiosk.

#### THURSDAY, SEPTEMBER 12, SETUP 7 PM

Telescopes for the Ritz-Carlton Bacara. We set up on the bluff lawn next to the Angel Oak restaurant.

FRIDAY, SEPTEMBER 13, SETUP 7 PM

Telescopes for Refugio Beach State Campground, in the day use parking lot, southwest corner.

SATURDAY, SEPTEMBER 14, 6 PM

Planning meeting in the classroom next to Javier's office at SBMNH. Come plan your club's activities. All are welcome.

SATURDAY, SEPTEMBER 14, 8 PM

Monthly Public Star Party, next to Palmer Observatory at SBMNH.

THURSDAY, SEPTEMBER 19, SETUP 7 PM

Telescopes for the Ritz-Carlton Bacara. We set up on the bluff lawn next to the Angel Oak restaurant.

FRIDAY, SEPTEMBER 20, SETUP 7 PM

Monthly Public Telescope Night at Westmont College, at the observatory, adjacent to the baseball field.

THURSDAY, SEPTEMBER 26, SETUP 7 PM

Telescopes for the Ritz-Carlton Bacara. We set up on the bluff lawn next to the Angel Oak restaurant.

FRIDAY, SEPTEMBER 27 - SUNDAY, SEPTEMBER 29

Annual AU Campout at the Mohawk Shores group site at Cachuma Lake.

ANNUAL AU CAMPOUT

The annual AU campout will take place at the Mohawk Shores group campsite at Cachuma Lake from Friday, September 27 (afternoon) through Sunday, September 29 (morning). The Saturday dinner will be at 5 PM. The number of cars we are permitted to have at the site is limited to about 20, so carpool or come early if you can. If we run out of car permits, and you have to pay at the entrance gate, keep your receipt for reimbursement from the AU.

Information on the Cachuma Lake Wildlife Cruises:

Be sure to reserve a place if you want to take the cruise on Friday (3 PM to 5 PM), Saturday (10 AM to Noon and 3 PM to 5 PM), or Sunday (10 AM to Noon), and meet at the marina 30 minutes before! Climb aboard the "Osprey" for a 2-hour lake tour with a Santa Barbara County Park Naturalist. The cruise takes a look at area wildlife, wildflowers, and resident birds along the shore. Reservations: At the entry gate, or call (805) 568-2460 weekdays 9 AM

to 3 PM, (805) 686-5055 weekends and after 3 PM. \$15/adults; \$10/child 5-12 years old; please no children under 5.

FROM THE PRESIDENT

Jerry Wilson

Our speaker at the August 2 meeting, Claudio Campagnari, a professor in the Physics Department at UCSB, gave an excellent presentation on the Higgs Boson. Referred to in the press as the "god" particle or the thing that gives mass to all other particles. Neither is accurate, we found out. The god reference is actually the first half of a common swear word uttered by a physicist when irritated by a reporter. The press just dropped the second half of the word. As for giving mass to all other particles, it only does so for other bosons.

What is a boson? Well, it's one of two types of baryons. Baryon refers to all known particles: electrons, neutrons, protons, etc. Baryons are either bosons or fermions. Bosons obey Bose-Einstein statistics and Fermions obey Fermi-Dirac statistics.

The principal difference is that bosons have spin of 0, 1, 2, 3... or integral spin. Fermions have spins of 1/2, 3/2, 5/2... or half-integral spin. Fermions have an exclusion principle in that if they're in the same system they cannot occupy the same state as another fermion. That's why there are energy levels in an atom - they can't all occupy the lowest energy level.

Bosons do not have an exclusion principle, so all bosons in a system can condense into the ground state or lowest available energy state. Such a boson condensate can show very counter-intuitive behavior, such as superfluidity and superconductivity. Electrons, each with half-integral spin, and therefore fermions, can pair up and act like a boson. This Cooper pair is a boson, and at low enough temperatures exhibits superconductivity.

What does this all have to do with The Higgs Boson? It's really just background. The result of finding the Higgs-Boson is still being worked out. Its existence, when put together with the most recent results from the CERN experiments, has thrown the field into a state of confusion.

## WHAT'S IN THE CLUB'S NAME?

Pat McPartlin

An Astronomical Unit is the average distance from the Earth to the Sun. The Club's name is, then, a subtle joke: either 93 million folks shown the night sky and/or 93 million club members. It's a challenge!

## CALENDARS FOR 2020 ON SALE

Pat McPartlin

At the September 6<sup>th</sup> club meeting (Friday, 9/6/19) I will have calendars for sale at \$10 each. These show the Deep Sky Mysteries, with beautiful photos of star clusters, nebulae and galaxies. They make great gifts, so come and buy one or more!



"You're kidding, Mike. These fell out of the back of a pickup truck?" Photo credit: Tom Totton.



"Some enchanted evening you will meet a stranger..." Photo credit: Tom Totton.

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**AU AstroNews**, the monthly publication of the **Astronomical Unit (AU)**, is mailed to the AU membership. For publishing consideration for the next month, submit astronomical items by the 20th of the current month!

**AU annual membership rates:**  
Single = \$20 Family = \$25

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# The Astronomical Unit

c/o Santa Barbara Museum of Natural History

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## September 2019

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2	3	4	5 RITZ-CARLTON BACARA 7PM	6 GENERAL MEETING 7PM	7 CACHUMA LAKE 8PM
8	9 TECH TALK KZSB (AM 1290) 9-10 AM	10 CAMINO REAL MARKETPLACE 7PM	11 CARPINTERIA STATE BEACH 8PM	12 RITZ-CARLTON BACARA 7PM	13 REFUGIO STATE BEACH 7PM	14 PLANNING MEETING 6PM SBMNH STAR PARTY 8PM
15	16	17	18	19 RITZ-CARLTON BACARA 7PM	20 WESTMONT COLLEGE 7:30PM	21
22	23 TECH TALK KZSB (AM 1290) 9-10 AM	24	25	26 RITZ-CARLTON BACARA 7PM	27 ANNUAL AU CAMPOUT	28 ANNUAL AU CAMPOUT
29 ANNUAL AU CAMPOUT	30					