

From the President

By Chris Angelos

April 5th starts the FPOA's 2014 season of 20 public programs and 8 solar programs as contracted with the State of California. I expect the attendance at our upcoming programs to increase this year. The FPOA Board of Directors has already received a number of requests from groups who want to visit the Fremont Peak Observatory for the scheduled public programs and also privately arranged programs. Because the observatory operations are supported almost solely on member's dues and private donations it is also critical for our existing members renew to their memberships and to continue bringing in new FPOA members. For those FPOA members inspired to increase their participation in FPOA activities, consider bringing your telescope to a public viewing night, tending one of the observatory's telescopes for public viewing, or even giving a presentation on a subject in astronomy at a public viewing night.

There are also work parties in the spring and fall to maintain the exterior of the observatory building and surroundings. These are some of the things the FPOA Board is working on this year.

We are again fortunate to have interns sponsored by Hartnell College to help with our public programs. Also remember the FPOA special events, the Star-B-Que on August 23 and the Member Appreciation Night on September 20. The Star-B-Que is also the FPOA's annual membership meeting where we vote in the board members for the coming year. Consider running for the board. We will have several openings for new members this year. You may have special skills or ideas to improve the observatory that are needed on the board.

Dialing the Observatory phone at 831-623-2465 will give you the schedule of events and an opportunity to record a message if you want to join any of the FPOA events. You can also send email to <info at fpoa.net >. The FPOA website at <http://www.fpoa.net/> gives a quick reference of all the FPOA events. I encourage all our FPOA members to take advantage of as many activities that they can.

FPOA Programs 2014

Saturday Evening Programs

Apr 5, 26 May 3, 24, 31
 Jun 7, 21, 28 Jul 5, 19, 26
 Aug 2, 16, 23, 30 Sept 13, 20, 27
 Oct 18, 25

Solar Programs

Mar 29 Apr 26 May 31 Jun 26
 Jul 28 Aug 23 Sept 20 Oct 25

Board Meetings

Jan 25 Feb 22 Mar 29 Apr 26
 May 31 Jun 28 Jul 26 Aug 23
 Sept 20 Oct 25 Nov 15

Special Events

Star-B-Que Aug 23
 Member Appreciation Night Sept 20

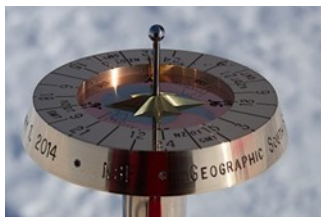
Please check <http://www.fpoa.net/schedule.html> for changes or updates to this schedule.

South Pole Neutrino Hunting

By Rob Hawley

The three stations on the Antarctica highlands are the most isolated places on the earth. From about February to October these are cut off from the rest of the world. "As remote as a Mars expedition" says the ESA [Concordia site](#). I had the privilege of visiting the most well-known of the sites, the US National Science Foundation South Pole Station.

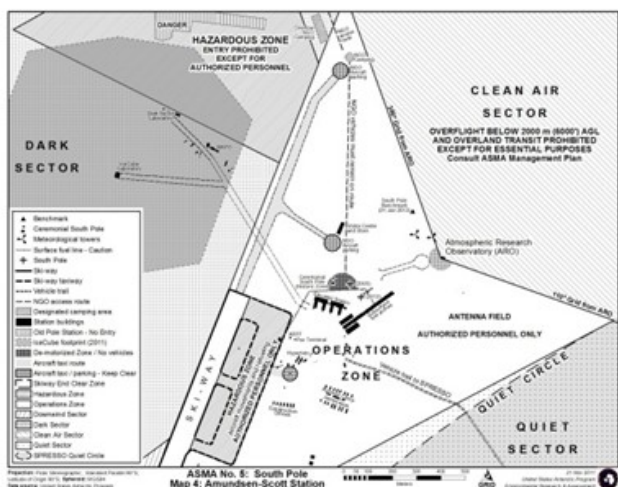
Neutrino Hunting from page 1



When you examine a map of South Pole Station one of the striking items is that every square inch has a purpose. Each area around the main station building is allocated to particular experiments; weather, geology, or astronomy. Our focus here was the astronomy experiments located in the “Dark Sector” roughly the entire left side of the station runway.



Ice Cube is the building on the right



Bicep-2

There must be a very compelling reason to commit the funds to build something here. Remember every component (and the people to install them) have to be flown (or sent by ship) to McMurdo Station from New Zealand. From there they have to be flown or caravanned overland to the pole station. All of this has to be done within a window of about November to February. The weather is frequently not as good as when I was there (high clouds with the wind chill only -38° C).

The Dark Sector currently has several experiments that take advantage of the pole’s low air pressure (similar to Mauna Kea even though physically lower) and exceptionally dry skies (lower humidity than the Sahara) to look at the cosmic microwave background and galaxy formation. However, the rest of this paper will focus on the Ice Cube neutrino experiment.

The location has two features that make it an interesting site for neutrino astronomy. Cosmic rays originating in the northern skies are blocked during the entire year. Also for 6 months each year, the earth blocks direct radiation from the sun.

The only particles observable from the north are neutrinos. Since neutrinos are not affected by electro magnetism or nuclear forces, they mostly pass through the earth. Since they also pass through the outer layers of the sun (or any other star) it gives astronomers the ability to directly observe what is happening in the most energetic portions of the star. One such use is that neutrinos detectors give an early warning of when a [supernova](#) is occurring.

If a neutrino is lucky enough to interact with some of the matter as it is passing through then it leaves a detectable signature. Under the South Pole station is more than a mile of pure crystalline ice. Neutrinos interacting with ice will cause a blue streak due to [Cherenkov light](#). Thus if you put some sensitive optical detectors into the ice you can observe the type, direction, and energy of the passing neutrino.

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Neutrino Hunting

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Ice Cube consists of 5,160 detectors buried 1500 to 2450 meters under the surface in 86 holes comprising about one cubic kilometer of ice. The one terabyte of information gathered daily from the sensors is processed by computers in the station and then sent for analysis.

The observatory concentrates on sources in the northern hemisphere. A detector on the surface is used to detect and eliminate the much more numerous detections caused by cosmic rays in the southern sky.

The scope has been operating since about 2010. The collaboration has published a number of papers to date. A good less technical explanation is available on [Wikipedia](#). For those that wish to dig into the details I suggest following the "Ice Cube" link below.

For pictures other pictures of the South Pole area please follow the "TravelQuest" link below.

For More Information

TravelQuest 2014 South Pole Trip

<http://goo.gl/YHEaOp>

Neutrino Hunters: The Thrilling Chase for a Ghostly Particle to Unlock the Secrets of the Universe

On Amazon: <http://goo.gl/R0bpME>

On iTunes: <http://goo.gl/XG0Kq9>

Picture of 2014 South Pole Marker

<http://goo.gl/4SPRbK>

Picture True South Pole, Ceremonial South Pole, and South Pole Station

<http://goo.gl/qxliyu>

South Pole Map

<http://goo.gl/0JVUBV>

Dark Sector Map

<http://goo.gl/yYOCQW>

Ice Cube

<http://goo.gl/vx7ObF>

Neutrinos and SuperNova

<http://library.lanl.gov/cgi-bin/getfile?25-14.pdf>

ESA Concordia

<http://goo.gl/54J0gU>

1. The third station is the Russian [Vostok Station](#)
2. For the record, our group was allowed on a single marked path from our NGO camp to the pole site

2014 Star-B- Que

By John Parker

It is only April, but your FPOA board members have already been preparing for our annual summer event. Each year members, family, friends and guests get together at the peak to enjoy good food, fun, games, a raffle, a guest speaker and an evening of observing. The event will take place on August 23, 2014, so mark your calendars.

The day will start with our annual General Membership meeting and public solar viewing program at 2 pm. We will be starting the grills about 4 pm and serving food around 5 pm. We will have our usual fare; burgers, dogs and chicken breasts, all cooked by volunteer board members. Drinks, condiments and utensils are provided. You are welcome to bring something to grill if you would prefer. As this is a potluck, please bring a side dish, dessert, salad, or your favorite dish to share. Save some room for dessert as we see some very creative Astro-Gastro contest entries that are not only really fun to look at but enjoyable to eat as well. Bring a dish having an astronomical theme and maybe you will win a fabulous prize! Entries will be judged based on culinary ingenuity, looks and astronomical relevance! Please try to have your entry ready before 6 pm. Entries arriving late may be consumed without judging! A prize will be awarded. We will have games and events for the kids and adults to educate and entertain.

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Of course there will be our prize raffle where you can help support the FPOA by purchasing tickets and have a chance to win some cool prizes from one of our sponsors of the Star-B-Que. We always feature a guest speaker who gives a brief and interesting presentation on an astronomy related topic. We are preparing our list of possible speakers and if you have someone in mind who you think would be interested in giving a presentation, please let us know.

When the sun goes down, an assortment of telescopes come out and, of course, we open up the 30" Challenger telescope to explore the night sky. If you have an observer membership, you are welcome to bring your favorite telescope and set up on the pads next to the observatory. Please remember to reserve the pads in advance.

Some of the other things that will be going on are the election of three of the nine FPOA board members. If you would like to nominate someone or even yourself, please send your nomination to info@fpoa.net.

Things to remember:

- Parking is \$6
- Bring layers of clothes; it may start out warm but it will cool off at night.

We sincerely hope that you will participate in this year's annual Star-B-Que, have some fun with your fellow FPOA members, family and friends. If you have any comments or thoughts you would like to share about this event, please feel free to email them to info@fpoa.net.

Hope to see you all there and we'll leave the red lights on for you.

Going South

By Pat Donnelly

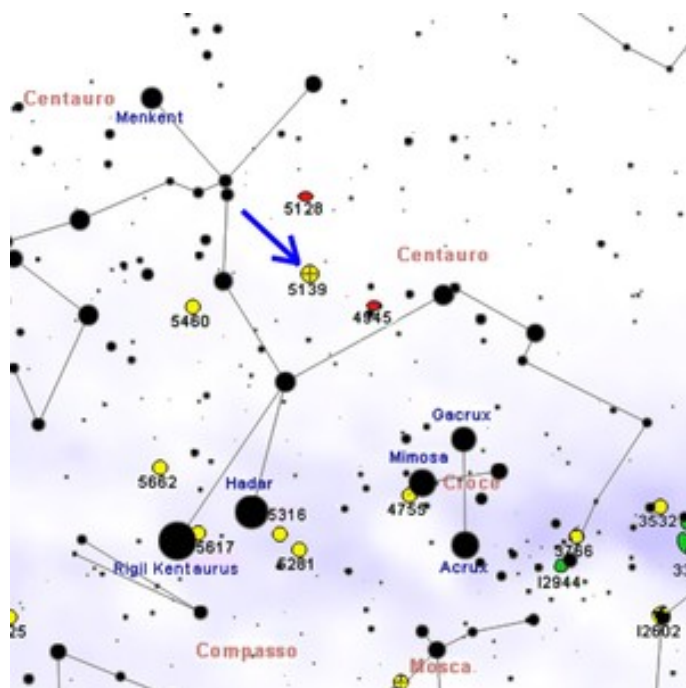
Every year in May, while helping with the Public Programs, a rather rare event takes place in the far southern skies above the peak. Below Virgo, when Spica is highest in the sky, two (2) other interesting objects (plus one) are visible, the globular cluster Omega Centauri (ω -Centauri) and the galaxy NGC 5128. These two (2) objects are quite unique. In fact, the upside-down garage door on the south side of the observatory and the previous shutters were installed specifically, so that one could view ω -Centauri and NGC 5128 with the 30 inch Challenger Telescope. The telescopic view of these objects is quite spectacular in a 30 inch telescope, but the

view of ω -Centauri has been somewhat dampened by the lights of the new prison.



If one wishes to find ω -Centauri and NGC 5128, they should begin at Spica. Spica is easy to spot, since it is the 15th brightest fixed star in the sky. NGC 5128 is

about 32 degrees directly below Spica, and ω -Centauri is another 5 degrees below NGC 5128. Both objects are visible in binoculars. I have observed both from the Fremont Peak Observatory with a pair of 7x50 binoculars. However, to easily find both objects I would suggest that one use a good pair of 11x80 binoculars. Start at Spica and scan straight down. One will come to two 3rd magnitude stars, "i" & "d"- Centauri. NGC5128 is about 4 degrees below d-Centauri and then travel another 5 degrees south to ω -Centauri. If one then travels east across the sky from ω -Centauri, one can find a bright +5.6 magni-



tude open cluster, NGC 5460. If you go hunting for these objects, remember that Spica has to be near

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the meridian, and these objects are only visible for about an hour.

NGC 5460 is approximately 2,500 light years from the earth and is about as big as the full moon in sky area. Relative to NGC 5128 and ω -Centauri (NGC 5139), ω -Centauri is much closer and brighter. ω -Centauri is the largest and the brightest globular cluster in the sky. It is so prominent that it was labelled as a star on early star charts. It appears as a fuzzy +3.7 magnitude patch of light to the unaided eye and has a surface area about two-thirds that of the full moon. ω -Centauri is approximately 16,000 light years from the earth. In recent years the general consensus around the astronomical community is that ω -Centauri is the nucleus of a dwarf galaxy captured and cannibalized by the Milky Way. NGC-5128 is a peculiar 7th magnitude galaxy known to radio astronomers as "Centaurus A." The galaxy appears as a giant elliptical galaxy with an encircling band of dust. On radio maps it is seen flanked by huge lobes of radio emissions as though material has been ejected by a series of explosions. NGC 5128 is about 15 million light years from the earth.

All of these objects are worth the search in the deep southern skies during the spring.

2014 Membership Renewal

Renewals are easy. You can use the forms on the membership page <http://www.fpoa.net/membership.html> to pay with either PayPal or via a credit card. For those preferring paper you can just send a check (that has your current correct address) to : FPOA Membership, c/o Rob Hawley, 1233 Hillcrest Dr, San Jose CA 95120

If you email has changed then please be sure to include that in either the PayPal payment as a comment or a note with your check.

EMAIL DELIVERY OF THE OBSERVER

Dear FPOA Members,
We have been delivering the Observer via email for the past several years. This obviously saves the Association postal expenses, and assures the quickest delivery to you. However, several of you no longer have valid email addresses, due to ISP changes, moves, etc. If you would like to continue to receive, or begin to receive, notification of the Observer via email, please send your current email address to membership at fpoa.net

Fremont Peak Observatory Association
PO Box 1376, San Juan Bautista, Ca. 95045

Officers and Directors—2014

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The Fremont Peak Observer is published four times a year (Winter, Spring, Summer, Fall). Articles from members are encouraged and should be emailed to <schedule at fpoa.net > Articles should be in plain text or MS Word format. Deadlines are Feb. 1, May 1, Aug. 1 and Nov 1, respectively.

FPOA on the Internet

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