



NAAPO (North American AstroPhysical Observatory)

"Signals"
Volume 9 Number 5
The NAAPO Newsletter
(June 1993)



Editor:

Earl W. Phillips, Jr.
7893 Thornfield Lane
Columbus, Ohio 43235
614-764-0476

NAAPO Coordinator:

Dr. Philip E. Barnhart
Dept. of Physics/Astronomy
Otterbein College
Westerville, Ohio 43081
614-898-1516

WARNER CABLE DONATION STRENGTHENS SETI EFFORT

During a routine inspection of the facility, **Steve Brown** and **Russ Childers** noted that the guy wires supporting both ends of the parabolic reflector were in need of replacement; several had snapped altogether and the others were rusted to the point of near death. **RO** volunteer **Tom O'Connor** inspected the situation and made suggestions as to their repair, noting that cable companies often have spare strand left over from construction projects, and suggested that we contact a local cable company to see if there would be any interest in donating enough to replace them.

WARNER CABLE came through for us in a big way! They donated, and delivered, a spool of 2500 feet of 3/8 inch, galvanized strand wire. This turns out to be slightly better than the existing guys, which are made of 1/4 inch strand. The large amount ensures that all the guys can be replaced, with enough left over for backup.

All of us involved with the telescope would like to thank **WARNER** personnel, especially **INGABORG MAY, BILL MOORE, DAVE KEYES, FRITZ FRYER, ALFREDO DELLA ROCCO, STEVE BERTSCH, AND GEORGE BOHICHIK**. It is due to their efforts and others at **WARNER** that we were able to receive the donation. This contingent from **WARNER CABLE** attended our regular Saturday meeting of 6/5/93, when they were treated to a tour of the facility by Director **Bob Dixon**. Some members of the **WARNER** contingent expressed interest in attending further meeting of the **RO**, as well as interest in optical astronomy. We will see to it they have the opportunity to involve themselves in both radio and optical astronomy to their heart's contents!

Though the guy wires are not primarily responsible for holding up the parabola, they do go a long way towards it's rigidity. The guys help hold the parabola rigid so that there is not a large amount of flex overall, plus they help ensure it's safety in wind storms. The guys currently in need of replacement have been in existence for roughly 30 to 35 years, so they have done their job well!

SOFTWARE DONATION RECEIVED

We have received a donation of VAX specific software and 8 inch disks from **Chris Williams**, of Dallas, Texas. He agreed to donate this large collection to us after his offer of sale was noticed by one of our volunteers on the Internet computer network. Once contacted, he immediately retracted his offer of sale and shipped us the entire collection! Our total cost? Just the shipping charges! **Thanks Chris!**

The radio observatory has a long history of volunteerism and donations. We would undoubtedly have had much rougher going if it were not for these dedicated volunteers and generous donors. A resounding round of thanks is due everyone, past, present, and future who have taken the time to volunteer their efforts or donated much needed items to us. Of course, our continued success is just as dependent upon these volunteers and donations! If you have always wanted to get involved in the **SETI** effort, but just didn't know how, contact us! There are many things you can do at the telescope to help further the effort. Similarly, if you have anything you would like to donate to the cause, let us know! You'd be amazed at the types of things we can use; from lawn and garden equipment to cash and computers!

Seen on the menu of a restaurant owned by a particle physicists' wife:

ITEM	PRICE
Electrons	-1
Protons	+1
Quarks	+/- 1/3
Neutrons	Free of Charge!

From: Tom Hanson

Subject: Tuesday Night Meeting

Date: 18 May 1993

There was a nice turnout for this evening's meeting. Drs. Barnhart, Dixon and Klein were present, along with the Steves: Brown and Janis, and Russ Childers. In addition, Dave (Dr. Klein's student), and Tom Van Horne were present. The meeting site, Room 805, in Dreese Hall, is much more spacious thanks to the efforts of Steve Brown, who moved selected equipment out into the hallway. Steve has been restoring equipment to operation, following disruption caused by the asbestos removal project. While everyone made reports on progress over the past week, I would like to highlight Dave's data collected by Russ Childers and Steve Brown. Dave's program is producing charts which show results comparable to those which Russ is producing with his Macintosh programs.

From: Tom Hanson

Subject: Chief Engineer Continues to Prove Mettle

Date: 23 May 1993

Friday evening, May 21st, I stopped in at Dreese 805 to see if Steve Brown might be able to help me put the MicroVAX back into operation, after it had swallowed a TK50 tape last fall, while I was preparing tapes for use. Steve Janis had arranged to have 50 or so TK50's wiped by OSU's high intensity de-Gaussing machine, and this meant that all the tapes had to be re-initialized before they could be used. Halfway through this operation, the tape problem occurred, and the infamous asbestos removal prevented further work. Before we looked at the MicroVAX, Steve showed me his success in bringing the VAX 11/750 back to life. It had been subjected to considerable trauma during the asbestos removal, and very few of the machines peripherals were in operation when Steve first turned it on. He had just completed a backup from disk to magnetic tape, as I walked in, demonstrating that the RL02 disk drives, the RK07s and the tape drive itself are working. Steve tackled the MicroVAX, and discovered that the glue which holds the leader on the self-loading TK50 cartridge to the magnetic tape had given way. The mechanism for automatic tape loading includes a piece of tape leader which is supposed to mate with the corresponding leader from the TK50. This leader was found to be loose in the tape winding bin, and Steve examined a second donated TK50 tape drive to figure out how it was supposed to be positioned. In short order, the tape drive was back in operation. We discussed the possibility of trading one of the two 130 megabyte disk

drives on the MicroVAX for an ethernet card, and agreed that such a trade would make sense, if anyone in the **Radobs** community happens to run across an ethernet card for the MicroVax 11.

6/5/93 MEETING NOTES

The meeting began at roughly 10am. The regulars in attendance were Phillips, Brown, James, Ayottes (3), Dixon, Childers, Janis, and Campanella. We were also visited by a contingent of **WARNER CABLE** representatives: Ingeborg May, Alfredo Della Rocco, George Bohichik, Steve Bertsch and wife Jill, and Fritz Fryer.

We began with a round of introductions of the regulars for the benefit of the **Warner** group. Then, Phillips related the fact that the parabola's guy wires were in need of replacement, and how **Warner Cable** came to the rescue (see lead article).

Dixon brings missing copies of *ANALOG* magazine, to round out his donation.

Childers continues to make observations of the hydrogen cloud, as well as of a source that has occurred in the past, which he suspects is a polar-orbiting satellite. He has produced charts of the suspected satellite, showing its position relative to the background. He, Brown, and James have repaired some of the flashing on the ground plane.

Janis has just returned from getting married (congrats Steve!), and is busy trying to get caught up.

John Ayotte's son **Ken** reports that school is out, and he would like to donate more time to the **RO**. **John** is still scanning in sections of the survey map to PC format.

Brown reports that he and Childers have traced a short in the **RO** phone system and repaired it. The computers at Dreese are still acting up, caused by the rough treatment they received during the recent Asbestos Removal project there. He is also doing some more programming of the 11/23 in the focus room. He and Childers picked up a donation of 400 feet of strand from **Coaxial Cable** in Russ' vehicle.

James reports that he and Campanella continue to work on the **SCR** project.

Phillips reports that the final phase of the local light pollution battle is near completion; the **City of Delaware** is close to enacting new, comprehensive lighting regulations, and he has been invited to give input at the final hearing on the matter. Additionally, **ODOT** has invited him to give input at a hearing they will be holding this month.

The meeting broke at roughly 10:45am, with most joining the **Warner** group on a tour of the facility led by Dr. Dixon. A very good explanation of the facility, as well as the assistance their donation will give us, was enjoyed by all, with a good number of questions being asked by the group. Interest by some of the **Warner** personnel was expressed to continue involvement in the **RO**, as well as getting involved in optical astronomy.

From: Angelo Campanella

Date: 1 Jun 1993

SCR PROGRESS 25 May - 1 June, 1993:

After a short and productive session today hosted by Steve and Russ, Don James and I got the Strip-Chart program to:

1: Hopefully be capable of negotiating hours and days continuously. It was a matter of re-encoding 'switches' and 'traps' to really do so. It was great to have a bona-fide A: drive for a change. Thanks, Don!

2: The hourly time and flux level announcement also states the chart speed and MINimum and the chart's MAXimum values.

3: A smoothing capacitor (about a .05 second RC constant) was added to reduce the 60 Hz ripple in the continuum signal to the A/D converter.

4: Regarding chart speed, I guess my digital arithmetic is rather poor: The "8 inches per hour" setup is more like 5 inches per hour! After this coming Saturday's meeting, I'll scale it off the chart record (real inches between hourly announcements) and then change the verbal statement constants to reflect reality.

5: Finally, the smoothing capacitor (5 uF) needs to be attached permanently to the Jones board, as well as the continuum wires — too many clip leads!

From: Russell K Childers

Subject: Should we contribute to the SETI Global Network?

Date: 3 Jun 1993

Bob Dixon received the following letter and questionnaire and handed it over to me to reply to. After reading it over several times, I realized that this is exactly the sort of thing which would spice up the bandwidth in 'this old newsgroup' :^).

This letter was sent only to the top 23 **SETI** bigwigs currently directing **SETI** projects. Its author is someone in France. He wants a reply ASAP. It may be possible to communicate with his organization via E-mail, but leave that to me right now. What I would like from you is a reply to the form letter. Please post all replies to private.radobs, and not to me. When replying, consider that some people believe that the discovery of a **SETI** signal can compromise their national security, so they may want to keep it hush-hush. Others may want to hog all the glory and may want to disclose very little information. Some of the answers may require more knowledge of practicing **SETI** than you have acquired. If so, you may ask me to clarify the question, or just say "don't know". Have fun! **OBJECT:** Would you contribute to the **SETI** Global Network?

SETI GLOBAL NETWORK PURPOSE

In case a 'candidate' signal is found, there is a need for rapid common action between individuals effectively involved in **SETI** 'field work'. Thus I proposed to set up a *SETI GLOBAL NETWORK (SGN)* to coordinate the activities of 'potential' discoverers. This proposal has been endorsed by the **IAA SETI Committee** (*business meeting, Torremolinos, October 8, 1989*) and by the **IAU Bioastronomy Commission** (*business meeting Buenos Aires, July 25, 1991*). It is specially intended for institutions and individuals involved in **SETI** field observations. Special topics for the Network are: **SETI** strategies / receivers and detectors / radio interferences / logistics / field tests of fast cross checking of alarms / field tests of continuous time monitoring of candidate signal / training for instant common action / cross linking by a fast communications network. Please answer all questions below, even if it is only a NO:

- 1- Do you agree to contribute to the SETI Global Network?
- 2- What are your opinions and comments about the way to insure that the alerts' authorship be acknowledged?

- 3- What number of alarms do you estimate you may provide? Now? Later?
- 4- What data do you think should be provided per alert?
- 5- Whom do you think should get access to the data?
- 6- Under which conditions?
- 7- Other comments.

Hubble Finds Evidence of Stellar Close Encounters

From: Ron Baalke

Organization: Jet Propulsion Laboratory

Space Telescope Science Institute, Baltimore, Md.

RELEASE: 93-109

NASA's Hubble Space Telescope (HST) has discovered a group of stars that apparently have been cannibalized of their cooler outer gas layers by other passing stars, resulting in stellar "naked cores" with surface temperatures five times hotter than Earth's sun. "This is amazing. These objects represent a totally new population of very blue stars," says Guido De Marchi, of the Space Telescope Science Institute (STScI), Baltimore, Md., and the University of Florence, Italy. "When we started wondering what they could be, we realized that they may be among the first observed stars to have been stripped."

The stars are located deep in the core of M15, one of the densest globular clusters known. A globular cluster is a "beehive swarm" of several hundred thousand stars held together by each other's gravity. If the cluster is exceptionally dense, chances are increased for close encounters of stars, in which bodies with strong gravitational attraction could strip other stars of their outer material.

"If our planet were there, we would see 100,000 stars closer than Proxima Centauri, the closest star to Earth's sun," said De Marchi. "The night sky would look simply fantastic."

De Marchi and Dr. Francesco Paresce of the European Space Agency, explain that this could only have happened if stars are so crowded together in the core they can be stripped of much of their gaseous envelopes by the gravitational pull of bypassing stars.

This stellar cannibalism could only take place where stars are so crowded together that chances for close encounters are exceptionally high, they said. De Marchi and

Paresce interpret the existence of this new class of stars as possible evidence that the center of the globular cluster has contracted to an extremely dense condition called "core collapse."

This research by De Marchi and Paresce is being announced at a press briefing today at the meeting of the American Astronomical Society in Berkeley, Calif.

The astronomers were surprised to discover about 15 hot blue stars segregated at the very core of M15. Their surface temperatures are above 60,000 degrees Fahrenheit (the sun's surface is 11,000 degrees Fahrenheit).

This discovery was possible only with the Hubble Space Telescope because it can resolve stars at the dense core of M15 that are only a blur from the ground. The observations also required Hubble's sensitivity to ultraviolet light to distinguish the hot stars from the surrounding cooler stars.

Such very hot blue stars can be made in several ways besides stellar stripping, such as magnetically stirred-up super massive stars, white dwarfs, or planetary nebulae. However, the researchers are quick to point out that none of these scenarios explain why the stars are so concentrated and so numerous only at M15's core.

"This rules out a number of other hypotheses," says De Marchi. He explains that all the blue stars lie within a 1 light-year radius at the very core of the cluster. What's more, 90 percent of them are concentrated at the very center of this volume, within a 4/10th light-year radius.

Close Encounters Of The Stellar Kind

According to this scenario, the new population of blue stars was once the cores of red giant stars. Such stars expand to enormous sizes late in their lives, due to changes in the nuclear "burning" at their cores. If the sun were the size of a red giant it would engulf the inner solar system out to the diameter of Mars' orbit.

Red giant stars are so distended that they have a weak gravitational hold on their outer envelope of cool gas. If a normal main sequence star passes within a few stellar radii it can rob gas from the red giant. This stripping process can, in theory, expose a star's core — the nuclear fusion "engine" that powers stars.

However, conditions where stars are so crammed together are unusual. For example, in the Earth's stellar neighborhood the stars are typically a million times farther apart than the distance between the sun and Earth.

Conversely, due to the relentless pull of gravity, the stars at the core of M15 have converged so that they are at about 500 times the distance between the Earth and the sun. The astronomers used Hubble Space Telescope's Faint Object Camera to probe the core of M15 (15th object in the Messier Catalog) which is located 30,000 light-years away in the constellation Pegasus. M15 is visible to the naked eye as a hazy spot 1/3rd the diameter of the full Moon.

Core Collapse

Globular clusters are compact "beehive swarms" of several hundred thousand stars loosely held together under the mutual pull of gravity. The stars are deflected by gravity if they pass near each other. During such close encounters a smaller, less massive star steals momentum from the larger star.

Because of these near-collisions, the massive stars lose momentum and "fall" toward the center of the cluster, like marbles rolling to the bottom of a funnel. Given enough time, massive stars should accumulate at the cluster's center. Theoretically, this could become a runaway collapse where stars quickly crowd together.

Previous Hubble observations suggest that the cluster probably contains powerful energy "storage batteries" in the form of double star systems, which prevent the core from imploding all the way down to a black hole. The rapid orbits of two stars about each other in tight binary systems create a powerful reservoir of kinetic energy. A few double stars can stir up the motion of in-falling stars. This would cause the core to rebound, like squeezing and relaxing a rubber ball.

Astronomers have long sought evidence for core collapse at the heart of very dense clusters like M15. To estimate the true stellar density from ground-based visible light photographs, however, has been difficult. The Hubble observation does not tell whether the core is still collapsing or rebounding.

Previous research by a team led by Paresce found that another class of unusual blue star, dubbed blue stragglers, also dwell at the cores of some clusters. However, even

the "stragglers" are not as hot nor as blue as the new population of blue stars in M15. Most of the blue stragglers are probably double stars that gravitationally capture each other. The capture stirs-up the stragglers' nuclear fuel. The star "resets its clock" to relive a bright and hot youth.

The researchers plan to use Hubble to peer into the cores of other globular star clusters to see if this new class of star dwells elsewhere as well.

ed.note: The precedintg article was taken from one of the newsgroups available on the Internet. Ron Baalke, its author, regularly updates the status of the planetary spacecraft currently exploring our Solar System, as well as articles such as this one that keeps us up to date on the more interesting "deep sky" news. I will try to include them as often as possible, space permitting. If there's anything else you'd like to see, let us know!

[\[Back to List of Issues in Volume 9\]](#) | [\[Back to List of Volumes\]](#) | [\[HOME\]](#)

[E-mail Webmaster](#)

Copyright © 2004 North American AstroPhysical Observatory

Designed by Jerry Ehman

Last modified: March 3, 2004