



# The Refractor

The Bulletin of the Eastbay Astronomical Society  
Founded in 1924 at Chabot Observatory, Oakland, California

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December 2007

## December 2007 Event:

### Eastbay Astronomical Society Holiday Party!

Sunday, December 16, 2007, 7:00 pm

Chabot Space & Science Center  
Physics Lab, 2nd Floor, Spees Building

Seeing as we don't really have a speaker this month, I thought this space might be good to introduce you all to a humorous take on the whole Intelligent Design farce. Intelligent Design, as opposed to Darwinian Evolution, and Science in general, is a rather hot topic. It's so readily debunked, one wonders how it possibly can be the subject of controversy. However, I thought that since we are a club of people who have an affinity for science (particularly the science of astronomy), I thought it would/should/might be safe to poke a little fun at our rather regressive brethren of the religious right. Here goes!

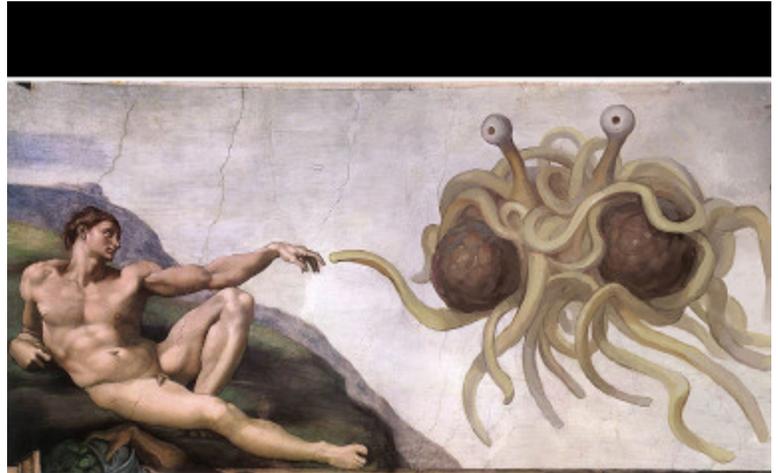
### Church of the Flying Spaghetti Monster

<http://www.venganza.org/>

Yes, you read that right! They've even got t-shirts, mugs, caps, pins, belt buckles, necklaces, and those fish-shaped magnetic stick-on things, so that proves they are not only for real, they're legitimate. Or, at least as legitimate as the concept of Intelligent Design.

Now, the basic basic concept of Intelligent Design is this: the universe is too complex to have evolved on its own. Therefore, someone or something with intelligence (i.e., God) must have directed things. If one challenges this, ah, *scientific* theory, one is asked to prove that it isn't true. That's their reasoning, their proof, and their best argument. I'm afraid, *that's it!* It's silly, I know, but, there you have it. The concept gained quite a bit of steam a few years ago, so much so, the Kansas State Board of Education elected to include it in their school system as required study, given equal time as for the study of evolution.

Enter Bobby Henderson, an Oregon State University physics graduate, who, in protest to their actions, sent an open letter to the KSBE requesting that FSM (Flying Spaghetti Monster, aka the *Spaghediety*) also be given equal study time. In



TOUCHED BY HIS NOODLY APPENDAGE

an excerpt from his letter, he says, *I think we can all look forward to the time when these three theories are given equal time in our science classrooms across the country, and eventually the world; One third time for Intelligent Design, one third time for Flying Spaghetti Monsterism, and one third time for logical conjecture based on overwhelming observable evidence.*

There's more. In a parody of the kind of logic Intelligent Design proponents use, he provides a graph showing that the decline of pirates (you know, "Ar, ar, matey!") from the 1800s is proof that their absence is directly correlated to global warming, and that if we could just make more pirates in the world, things would get better, temperature-wise.

There's even MORE, but not enough room to do it justice, here. Go to the website, look it up at Wikipedia, and you too can "be touched by his Noodly Appendage." RAmen. ★

EAS POTLUCK  
HOLIDAY PARTY  
PLUS MEMBERS  
ONLY VIEW NIGHT

7PM  
PHYSICS LAB  
2ND FLOOR  
SPEES BUILDING  
CHABOT SPACE &  
SCIENCE CENTER

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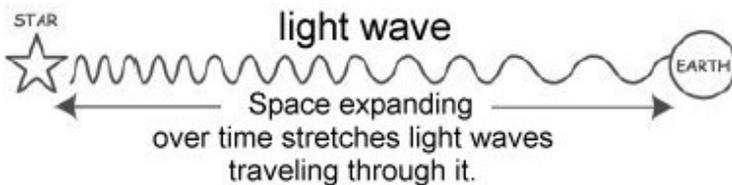
(This is a short holiday issue)

## Clues from Ancient Light

Some people are good at telling other people's ages. They can look at you and know you are 9 years old or 22 or 49 or 99. How? They read the clues: your size, shape, proportion, gray hair (or no hair), wrinkles, how you talk, and how you act.

Astronomers know how to tell the ages of the stars — or least the ages of the stars' light. What clues do they use? Light changes as it travels through space and time. It's as if, like aging humans, the light gets "tired." Light that has been traveling a long, long time (say, billions of years) starts looking pretty tired! Astronomers say that the light is **red-shifted**, because red light has the least energy of all the colors of the light we can see with our eyes.

No matter how "old and tired" light is, it always travels at the same speed in space: 300,000 kilometers (or 186,000 miles) per second (in round numbers). That means it takes some amount of time — a little or a lot — for light to get anywhere. The distance light can travel in one Earth year is called a **light year**. A light year is very long distance: around 9 trillion kilometers (6 trillion miles).



Light travels in waves, just as energy traveling through the ocean pushes the water into waves. But as light waves travel through space, they gradually get stretched out. That is because, along with the universe, space itself is expanding and stretching the distances between things.



Image of M81 in ultraviolet light taken by NASA's orbiting GALEX space telescope

### GALEX Looks Back in Time

GALEX (short for Galaxy Evolution Explorer) is a space telescope that was launched into orbit around Earth in 2003. From space, GALEX gets a great view of the ultraviolet light from stars,

without Earth's atmosphere getting in the way.

GALEX is now looking at most of the galaxies in the Universe. A galaxy is a grouping of stars. All but a few stars in the universe live in galaxies. Our Sun is just one of at least 200 billion stars in our own Milky Way Galaxy.

GALEX sees starlight that has been traveling for just a few years from stars that are "only" a few trillion kilometers

away. But it also sees really "tired" starlight that has been traveling over 10 billion years! That is more than two-thirds of the age of the whole Universe! So GALEX is seeing galaxies as they were 10 billion years ago, as well as how the nearby galaxies looked just a few hundred thousand years ago. Just as you look younger in a picture of you from several years ago,



GALEX sees pictures of galaxies when they were much younger than now. So astronomers can look at the young galaxy pictures from far away (and long ago), compare them with pictures of older galaxies nearby (very recent) and see how galaxies and their stars are born, age, and die over time. They can learn how galaxies *evolve*.

### Learn More

#### Books:

*Universe* by Robin Kerrod, DK EYEWITNESS BOOKS, 1st ed. (March 2003), ISBN:0789492385 (ages 9-12).

*Galaxies* by Seymour Simon, Harper Trophy, Reprint ed., 1991, ISBN:0688109926 (ages 9-12)

*Our Galaxy and the Universe* by Ken Gruan et al., Ken Press, 2002, ISBN:1928771084 (ages 9-12).

#### Websites:

GALEX Website: <http://www.galex.caltech.edu> .See "Image Gallery."

The Space Place: <http://spaceplace.nasa.gov> .Under "Projects," see "Galactic Mobile" and "Galaxy Montage"

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration. ★

*What we have done for ourselves alone dies with us; what we have done for others and the world remains and is immortal. ~Albert Pike*

## Volunteers Needed at Chabot

It's fun, it's easy, and it's vital not just toward the Chabot Space & Science Center's continued existence, though that in itself is a worthy goal, but to inspiring the children of the Bay Area to become the next scientists, engineers, astronauts, and technical pioneers who will further Humanity's urge to survive through increased knowledge of our world, and the Universe.

Call Megan Gray, Chabot's Volunteer Manager at 510 337-7414 to find out how you can help Our (Favorite) Place in the Universe live long, and prosper, through the 21st Century, and beyond. ★



## Editor's News 'n Views

*Howdy astro fans!* There's no meeting this month, but we've got a holiday pot-luck party coming up in just a few days (Sunday, Dec 16), which will occur at the same time as this month's MOVN. When we're not ogling the wonders of the night

sky through Chabot's big telescopes, we'll be munching on goodies, drinking egg nog, and recounting all the fantastic things we did this last year, and about the things we plan to do, next year. And what a year it's been. **Kingsley Wightman** passed, **Carter Roberts** got the Western Amateur Astronomers G. Bruce Blair Award, Nellie's mirror got cleaned, re-aluminized, and coated, we lost one Alex and gained another (**Alexandra Bennett** resigned as the director of CSSC, and **Alex Zwisler** replaced her), we made the trip to Barcroft again, and had great weather, heard many excellent speakers (thanks, Dave!), saw and took pictures of lots of amazing and beautiful objects not of this Earth, including the most unusual comet to be seen in a very long time (17/P Holmes), and did a lot of valuable support for Chabot, and lots of outreach events to promote amateur astronomy in the Bay Area. Oh, and I mustn't forget: we're on the cusp of reactivating the Loaner Scope Program, thanks to the interest and drive of **Ray Wong**, our newest EAS Board member. Thanks, and congratulations, Ray!

Chabot and the EAS are planning to work together more for the new year and beyond. We would like to help them with greater volunteer support for programs such as weekend daytime solar viewing with the public, and outreach events for schools and organizations (such as the Boy and Girl Scouts). We could really really use more help, as the few of us doing these things regularly feel a little lonely in our quest to promote astronomy and the space sciences to the public.

The EAS Volunteers who give their time to the club and Chabot include for this year: **Rebecca Arntz, Lynn Brechtel, Celeste Burrows, Claire Chapin, Bill Drelling, Debbie Dyke, John Fang, Alan Fisher, Terry Galloway, Paul Hoy, Conrad Jung, Linda Lazzeretti, Billy Liang, Sophie Lee, Roland Maski, Gerald McKeegan, Richard Ozer,**

**Carter Roberts, Dave Rodrigues, Don Saito, Bob Schalck, Bruce Skelly, M Selph, Bruce Skelly, Ken Swagerty, Paul Terrill, Ray Wong, and Paul Zurawski.** (If I forgot anyone, please let me know!) Thanks



*Ray Wong shows public the Sun in h-alpha*

guys and gals! Your actions have benefited hundreds of children and adults this year, and the unseen and untold beneficial effects you've had on society and the world will not be insignificant.



*Chabot's Starry Night Gift Shop is chock full of great ideas for your holiday gift lists*

On another subject: Yikes! It's *almost Christmas!* Just a reminder that the Gift Shop at Chabot is chock full of unusual, fun gift items that kids and adults would be thrilled to have.

They've got games, toys, science kits, post-

ers, coffee mugs, t-shirts, sweat shirts, DVDs, telescopes, eyepieces, books, globes, stuffed birds that sing, freeze dried Astronaut Ice Cream, calendars, mobile art, black lights, astronomy software, the *2008 Astronomical Pocket Diary* (a perfect stocking stuffer), and much more!

For you Telescope Makers' Workshop monkeys, here's a bit of info you'll be interested in: Mike Acosta from Southern California has started a small business called Phoenix Electroformed Products, Inc. He coats mirrors and diagonals for amateur astronomers, and can handle any size up to 22-inches in diameter. He can also strip old coatings, and also handles protective silicon monoxide coatings, too. His prices range from \$30 for a 6" mirror, to \$150 for a 22" mirror, but contact him to get an exact price, as certain variables can change the price. Here's his contact data:

Mike Acosta, Coating Specialist  
Phoenix Electroformed Products, Inc.  
31951 Corydon Road, #130  
Lake Elsinore, CA 92530  
Ph: 951 674-5600  
Fx: 951 674-5602  
Email: macosta@pnxinc.com

And that's it for now! ★

### FUTURE CONJUNCTIONS—2007

(The year is practically gone, so this list is *tiny*.)

Dec 13 Board Meeting, Chabot, Soda Board Rm, 7:30pm  
16 MOVN @ Chabot, Wightman Plaza\* and Club Holiday Party

\*Members Only View Night:  
No need to call to confirm, this month—even if it's raining, we'll have our party to attend.



# Eastbay Astronomical Society

Post Office Box 18635 • Oakland, CA 94619-0635

**December 2007**  
RETURN SERVICE REQUESTED

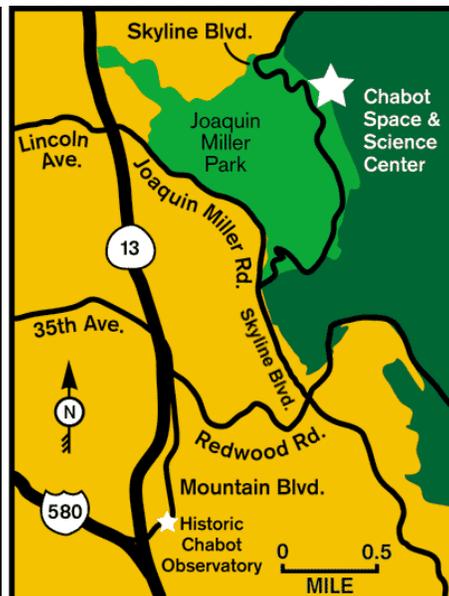
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Articles and photos for *The Refractor* are encouraged. Deadline for the January 2008 issue is January 5, 2008. Items may be submitted by mail to:  
Editor - 3514 Randolph Avenue, Oakland, CA 94602-1228. Internet email address: donsaito@comcast.net Hm: (510) 482-2913.



### Join the Eastbay Astronomical Society

- Regular, \$24/year
- Family, \$36/year
- Contributing, \$40/year
- Student, \$15/year (digital news-letter, only)
- Sustaining, \$60/year or more

#### Discounted Magazine Subscriptions:

- Sky & Telescope \$32.95 (order between July & December)
- Astronomy \$34 (order between July & December)

*Note: Note: Each membership year begins November 1, and ends October 31. New memberships starting from July - October will be good through to the end of October of the next year*

Contact: EAS Treasurer  
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Email: geraldspace@earthlink.net

**Sign up online at <http://www.eastbayastro.org/> (click on the Membership link for PayPal purchasing options)**