

The Refractor

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

Volume 84
Number 12

October 2008

October 2008 talk:

The Secret Lives of Galaxies

When:

Saturday, October 18, 2008, 7:30 pm

Speaker:

UC Berkeley Grad Student, Katey Alatalo

Where:

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

The Hubble sequence of galaxies at first glance appears to be nothing more than an Audubon classification chart, but underneath the neatly lined up shapes and colors, there lies a complex and violent history. Through the lens of radio, infrared, UV and optical astronomy, we can deduce their histories, and more importantly, their future. Nearby examples of every stage in the Hubble sequence provide living galactic fossils to study their 10 billion years of evolution that humans had not been around to witness.

In this talk, I will provide an observational tour of the Hubble sequence, starting with the "young" (late-type) galaxies and working toward "old" (early-type) galaxies. How are they different both macroscopically and microscopically? What would life be like in each type? By what mechanism will a late-type evolve into an early-type?

Building a full understanding of how each piece of the puzzle fits with every other piece not only gives us a better understanding of galaxy evolution over the age of the universe, it sheds light on the most fundamental human question of how we got here.

Katey Alatalo is a 4th year graduate student at UC - Berkeley. She works with Prof. Leo Blitz on galaxy evolution using the CARMA millimeter-wave radio array in Owens Valley,

CA. Katey likes biking, photographing, camping, hiking, and watching movies. She also has been a volunteer for Chabot Space & Science Center in the past. ★



Billions of years from now, only one of these two galaxies will remain. Until then, spiral galaxies NGC 2207 and IC 2163 will slowly pull each other apart, creating tides of matter, sheets of shocked gas, lanes of dark dust, bursts of star formation, and streams of cast away stars. Astronomers predict that NGC 2207, the larger galaxy on the left, will eventually incorporate IC 2163, the smaller galaxy on the right. In the most recent encounter that peaked 40 million years ago, the smaller galaxy is swinging around counter-clockwise, and is now slightly behind the larger galaxy. The space between stars is so vast that when galaxies collide, the stars in them usually do not collide. Photo by Debra Meloy Elmegreen (Vassar College), et al, and the Hubble Heritage Team.

It's Membership Renewal Time

The EAS Membership Year starts each year on the first of November, so if you're not a Lifetime member, or haven't signed up for 2009, yet, yer going to be *outta there!* Don't let it happen!! Sign up for another great year with the Eastbay Astronomical Society - you'll be glad you did! See blue insert, inside for details.

DINNER WITH THE SPEAKER

5:30 pm
Saturday, October 18
HUNAN YUAN
4100 Redwood Rd., #11
(next to Safeway)
Oakland
(510) 531-1415
No need to confirm—just show up!

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Extreme Starburst

by Dr. Tony Phillips

A star is born. A star is born. A star is born. Repeat that phrase 4000 times and you start to get an idea what life is like in distant galaxy J100054+023436.

Astronomers using NASA's Spitzer Space Telescope and ground-based observatories have found that the galaxy gives birth to as many as 4000 stars a year. For comparison, in the same period of time the Milky Way produces only about 10. This makes J100054+023436 an extreme starburst galaxy.

"We call it the 'Baby Boom galaxy,'" says Peter Capak of NASA's Spitzer Science Center at the California Institute of Technology in Pasadena, CA. "It is undergoing a major baby boom, producing most of its stars all at once. If our human population was produced in a similar boom, then almost all people alive today would be the same age."

Capak is lead author of a paper entitled "Spectroscopic Confirmation of an Extreme Starburst at Redshift 4.547" detailing the discovery in the July 10th issue of *Astrophysical Journal Letters*.

The galaxy appears to be a merger, a "train wreck" of two or more galaxies crashing together. The crash is what produces the baby boom. Clouds of interstellar gas within the two galaxies press against one another and collapse to form stars, dozens to hundreds at a time.

This isn't the first time astronomers have witnessed a galaxy producing so many stars. "There are some other extreme starburst galaxies in the local universe," says Capak. But the Baby Boom galaxy is special because it is not local. It lies about 12.3 billion light years from Earth, which means we are seeing it as it was 12.3 billion years ago. The universe itself is no older than 14 billion years, so this galaxy is just a youngster (Capak likens it to a 6-year-old human) previously thought to be incapable of such rapid-fire star production.

The Baby Boom galaxy poses a challenge to the Hierarchical Model of galaxy evolution favored by many astronomers. According to the Hierarchical Model, galaxies grow by merging; Add two small galaxies together, and you get a bigger galaxy. In the early years of the universe, all galaxies were small, and they produced correspondingly small bursts of star

formation when they merged. "Yet in J100054+023436, we see an extreme starburst. The merging galaxies must be pretty large."

Capak and colleagues are busy looking for more Baby Boomers "to see if this is a one-off case or a common occurrence." The theory of evolution of galaxies hangs in the balance.

Meanwhile... A star is born. A star is born. A star is born. See more breathtaking Spitzer images at www.spitzer.caltech.edu/Media/mediaimages. Kids can play the new Spitzer "Sign Here!" game at spaceplace.nasa.gov/en/kids/spitzer/signs. ★



The "Baby Boom" galaxy loosely resembles the galaxy shown here, called Zw II 96, in this Hubble Space Telescope image. This galaxy is only 500 million light-years away, while the Baby Boom galaxy is 12.3 billion light-years away.

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

Chabot Space & Science Center Invites EAS Members to Volunteer with Us!

- Share your knowledge of and passion for astronomy with thousands of CSSC visitors
- Experience the unique opportunity to operate Chabot's historical telescopes
- Share your own telescope at Chabot*
- Inspire young astronomers and future scientists by assisting students in our astronomy education programs

Explore these opportunities at our next Volunteer Orientation:

Saturday, October 18th, 10:00-12:30pm

Please RSVP to volunteers@chabot.space.org

* EAS members who are only interested in sharing their own telescope at Chabot are required to attend a Chabot volunteer orientation and complete a self-guided training worksheet entitled "Getting to know Chabot." After completion, you may join us on deck and share your own telescope any Friday or Saturday night!



Editor's News 'n Views

Howdy Astro fans! The Chabot 125 Year Fundraising Gala held Saturday, September 13, was a huge success! Not too surprising: they've been promoting it for months - every streetlight in all of downtown Oakland was flying flags with the Gala logo for months,

now. They planned everything out to the nth degree, and the final execution went off without a hitch, save one item, which we (the EAS) were responsible for. Thankfully, it wasn't something any of the attendees noticed, but we *thought* we had been invited to provide a telescope making demonstration for the guests, but we apparently really weren't - we just thought we were. Richard Ozer, Dave Barosso, and several others from the TMW came all prepared to set up the demo, but Chabot knew nothing about it! Feathers were ruffled, and some harsh words were exchanged (which have since been retracted and apologized for), but it was a mess. We (the EAS Board of Directors) learned a valuable lesson in communication and coordination so future such incidents will be avoided. Other than that, the guests were wonderfully wined-and-dined, entertained with interactive science-oriented activities, and Chabot raised more money than any fundraiser to date, to continue and enhance their programs and operations.

Here's some long awaited and welcome news: the EAS/CSSC Library is now open and available to the EAS. Here's the news note from CSSC's Volunteer Newsletter:

Thanks to CSSC volunteers Kathy Sawyer, John Fang, and Dave Birnbaum, who have offered to help us open our library and resource center to Staff, Volunteers, GEs, Interns, and EAS members on a regular basis. Initial limited hours are in effect, Thursdays (11-2pm) and Fridays (3-5pm). Please review the library guidelines and protocol posted on the volunteer website and in the library. Enjoy! Says Terry Galloway to this announcement: All the 20 years of work and hope have finally paid off. Thanks to everyone who worked so hard with donating books and journals, planning, boxing books, moving boxes, shelving, unshelving, boxing, cataloguing, shelving, completion of cataloging. So, go take a look, now that we can, and if possible, help out with some volunteer hours of your own to enhance and broaden this wonderful resource.

Now, here's a real news bomb: In the not-too-distant future, I'm taking a several month leave of absence from being your newsletter editor(!) I'm getting laid off from my 10+ year job as an IT Specialist at the University of California's Office of the President, Office of Technology Transfer. They, like so many others in these hard economic times, are "consolidating," so my job is going bye-bye. I decided, therefore, that to "turn that frown upside-down," and make this an *opportunity* to do a few things I've always wanted to do, but

never could while being a working stiff, such as: tour America on a recumbent cycle. I'm guessing a tour of that magnitude will take at least 6 or 7 months (or more?), and so I'll need to find someone who can do the newsletter for that time while I'm away. So! Who amongst you would be willing to help me and the club out, here? I won't be leaving until at least mid-to-late Spring, so you've got several months to cozy up to the idea, and I'll talk about it more in future issues, I'm sure.



This is a very similar design to the recumbent tricycle that I'll be getting, except the front and back wheels will be the same size (bigger than the small ones, but smaller than the rear big one), and my legs aren't nearly as shockingly pale.

I'll probably still submit articles to the newsletter from my travels around the country, too, so you won't be entirely rid of me, no matter what.

Continued next page

FUTURE CONJUNCTIONS—2008

- Oct 5 MOVN @ Chabot, Wightman Plaza*
- 9 Board Meeting, Chabot, Soda Board Rm, 7:30pm
- 12 Japanese Moon Festival outreach event, Lake Merritt, Oakland (details inside)
- 16 Orinda Science Night outreach event (details inside)
- 18 General Meeting, Chabot, Physics Lab, 7:30pm
- Nov 2 MOVN @ Chabot, Wightman Plaza*
- 13 Board Meeting, Chabot, Soda Board Rm, 7:30pm
- 15 General Meeting, Chabot, Physics Lab, 7:30pm
- Dec 3 MOVN @ Chabot, Wightman Plaza*
- 11 Board Meeting, Chabot, Soda Board Rm, 7:30pm
- (tba) Holiday Potluck Party (new and improved!)

*Members Only View Night:
Always call 510 482-2913 after 5pm to confirm

NOTE: Dates and times may change. We will provide as much advance warning as possible.

¹ Leave message for Don Saito at (510) 482-2913 if you're interested in helping out at this event

Bill's Barcroft Photos

EAS Board Member, Bill Drelling, is an excellent and enthusiastic astrophotographer who went up to the annual EAS Barcroft High Altitude Star Party last month. He captured some stunning shots of various deepsky objects with his Canon 20DA, a Canon 135mm lens, and an AP900 mount. Guiding was done with an SBIG STV E-Finder, and the five 10-minute exposures for each image were combined using the freeware software program, *Registax*.



A wide field image of the Lagoon, Trifid and the Inkspot. This region of the sky is densely packed with stars.



Spiral Galaxy M33. This image is a stack of 5 images, 10 minutes long each.

The Lagoon Nebula from prime focus with Canon 20DA, Takahashi FSQ-106 refractor on an AP900 mount. Guided with SBIG STV E-Finder. A stack of 5 exposures of 5 minutes duration each combined in Registax. ★



News 'n Views
Continued from Page 3

We continue to work on sorting, organizing, and cleaning the home of our late President, Carter Roberts, so Estate Executor Dave Rodrigues can sell it and give the proceeds of the sale to Chabot. We figure the property is worth close to a million dollars - it has a spectacular view of the San Francisco Bay. In fact, as a break from our work, we watched the Blue Angels show with binoculars during the recent annual Fleet Week celebration, and could see practically the entire scope of their maneuvering range, from Daly City to San Rafael, Richmond to beyond the Golden Gate Bridge. In other words: nice view! The cleanup work is slow and at times incredibly tedious, but we just keep hacking away at it, and are making noticeable progress. For example, the front dining room, which we call, "The Map Room," used to be a solid mass of "stuff." You couldn't go into the room, you could only pass by it. Now, you can go in, walk over to the front windows, and open the curtains! We exposed a dining room table that Carter had forgotten was in there! Similar gains have been made throughout the house. And there are always little surprises, such as finding a poster with Clyde Tombaugh's sig-

nature on it, or an autobiography that Carter did in crayon and pencil when he was in the 4th grade. We can always use more help, so if you're interested, let me or Dave know (our contact info is on the last page of the newsletter).

We once again did the annual outreach star party at the Otsukimi Oakland Sister City Moon Festival at the Garden Center, Lake Merritt. Paul Hoy, Conrad Jung, Gerald McKeegan, Dave Rodrigues, Ray Wong, and myself set up our scopes and provided views of the Moon, Jupiter, and Venus for the attendees, while we munched on Japanese food and listened to the Taiko drummers from outside, in the garden area. There were a lot more people, this year, so it's a

good thing we had a bunch of scopes and operators. Dave did his AstroWizard stuff, and everyone had a great time.

That's it for this month! ★



The AstroWizard conjures up yet another SuperNova, and the crowd goes wild!!

Spare Shots

Rachel.



▼ Chabot Volunteers Alberto Rulloda and Brian Cornell take their wedding vows out on Wightman Plaza in Chabot's first gay wedding. As a dramatic element to the start of the ceremony, Don Saito rotated and opened Rachel's dome.



▲ Jean Quan and Dick Spees enjoy the fruits of their labor at the Chabot 125 Year Gala event.



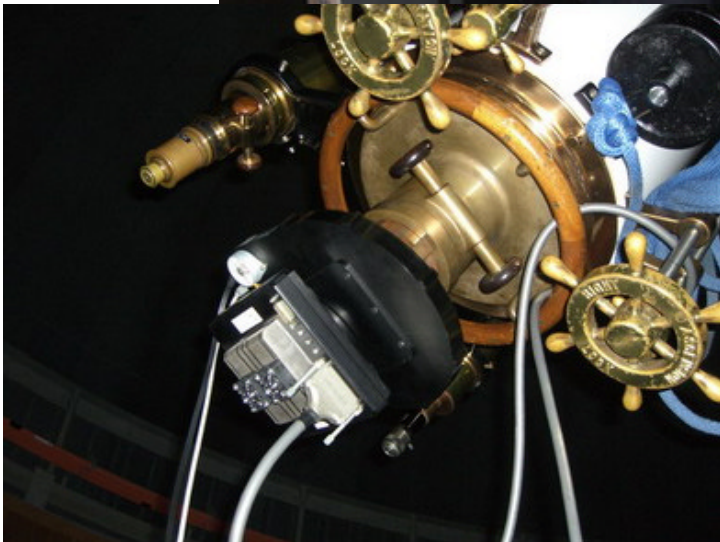
► Director of Chabot, Alex Zwissler, lets the party attendees know all the good news about the facility's current status, and thanks them for their support.



► Young telescope maker works a mirror he can barely lift!




▼ Chabot's \$50K CCD astro-cam mounted on



◀ Another telescope maker working a mirror she can hold in the palm of her hand.



That's it for now! ★



Eastbay Astronomical Society

At Chabot Space & Science Center
10000 Skyline Boulevard ● Oakland, CA 94619

October 2008
RETURN SERVICE REQUESTED

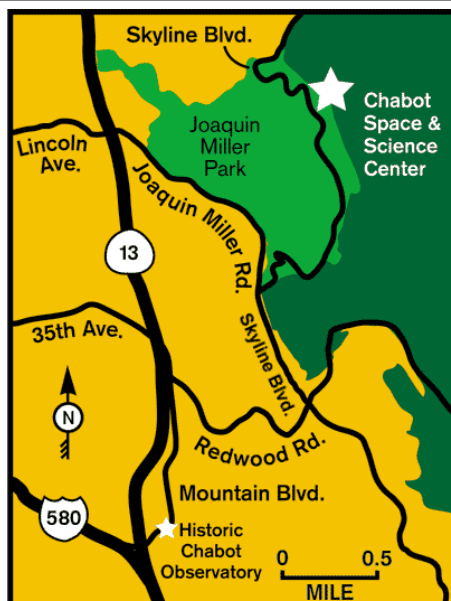
Eastbay Astronomical Society

President: Paul Hoy (510) 531-6305
Treas: Gerald McKeegan (925) 926-0853
Secretary: Linda Lazzaretti (510) 633-2488

ahoy@aol.com
geraldspace@earthlink.net

Vice President: Alan Fisher
Membership Reg: Bruce Skelly EastbayAstro@gmail.com
Events Coord: Dave Rodrigues (510) 483-9191

Articles and photos for *The Refractor* are encouraged. Deadline for the November 2008 issue is October 31, 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.



FUTURE CONJUNCTIONS

- | | | |
|-----|----|---|
| Oct | 5 | EAS MOVN, Wightman Plaza 7:30pm—10pm* |
| | 9 | Board Meeting, Chabot, Soda Board Rm, 7:30pm |
| | 18 | EAS General Meeting, Chabot Physics Lab, 7:30pm |
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*Always call 510 482-2913 after 5pm to confirm

Join the Eastbay Astronomical Society

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

Contact: Gerald McKeegan, EAS Treasurer
Telephone: (925) 926-0853 Email: geraldspace@earthlink.net
Mail: 1760 1st Ave, Walnut Creek, CA 94597-2561

Sign up online at <http://www.eastbayastro.org/>

EASTBAY ASTRONOMICAL SOCIETY MEMBERSHIP APPLICATION FORM

New Membership Renewal of Existing Membership

NAME: _____
(please print)

ADDRESS: _____

CITY, STATE, ZIP _____

DAY PHONE: (____) _____

EVE PHONE: (____) _____

EMAIL ADDRESS: _____
(please print very legibly!)

MEMBERSHIP CATEGORIES:

- Regular \$24 Family \$36 Contributing \$40
 Sustaining \$60 or more \$ _____ Student \$10 (digital newsletter only)

Optional discounted 12-month magazine subscriptions:

Sky & Telescope \$32.95 Astronomy \$34.00 (both magazines may only be ordered between the months of July and December) (**New** subscriptions to Sky & Tel are paid to EAS. **Renewals** get paid directly to Sky & Tel.)

Optional, tax deductible donation(s) to any of the projects of the Eastbay Astronomical Society:

Burns Library \$ _____ Betty Neall Youth Award Fund \$ _____ General

\$ _____ Other: _____

EAS Lapel Pin \$3.00 +\$1.00 per pin for shipping and handling. # of pins _____ Total Amount for # of pins \$ _____

(Tip: If you buy them at a club meeting or event, you can avoid the S&H fee.)

Total Enclosed: \$ _____

Please mail this form and your check or money order payable to:

Eastbay Astronomical Society

PO Box 18635

Oakland, CA 94619-0635

For more information, please contact Membership Registrar Bruce Skelly at EastbayAstro@gmail.com, or the address, above.

By default, (if you have an email address) you will be notified by email that the digital (.pdf) version of the club newsletter is ready to download off the club website. If you prefer to get the B&W hard copy, please check the box below:

I prefer the hard copy mailed to the address entered above.

And,

Are you interested in volunteering your time/equipment for public stargazing at Chabot?

Are you interested in doing other volunteer work for Chabot and/or the Eastbay Astronomical Society?

THANK YOU FOR JOINING US!

Membership has its privileges...

- **Monthly newsletter, *The Refractor***, with interesting articles on currently visible constellations, upcoming lectures, club events, stories, equipment reviews, local news, and more.
- **Monthly meetings** with featured guest speakers on all subjects from Astronauts to Zooming telescope eyepieces; from finding deep-sky objects, to planetary geology. Every and any thing having to do with astronomy, telescopes, and the space sciences. All that, and cookies and sodas, too!
- **Help and advice to new telescope owners.** Got a new telescope and don't know what to do with it? Bring it to a meeting; we'll be able to help you figure it out! If you're interested in getting a telescope, we can give you some good advice; be warned: there are a *lot* of bad telescopes out there!
- **Members-Only view nights at Chabot's large telescopes** to avoid the weekend crowds. We view galaxies, nebulae, star clusters, planets, the Moon, comets, double-stars, and whatever else is up!
- **Weekly star parties at Chabot.** Interested EAS members get trained to operate the big 'scopes (Leah, Rachel, and Nellie, the 8", 20", and 36" telescopes housed in three separate observatories) for Friday and Saturday night public viewing.
- **Yearly events:** Annual EAS Awards Dinner, star parties at nearby dark-sky sites, the Barcroft Station high-altitude star party in the White Mtns.
- **Telescope Makers' Workshop.** Friday evenings from 7–10 pm, hosted by Chabot, and operated by the EAS. For a small fee, plus the cost of the mirror and "tool," we will provide instruction and grinding/polishing supplies needed to make your own telescope mirror for less than half the cost of a store-bought one, that will likely be optically superior!
- **Advanced Astro-research Groups** using Chabot's large telescopes. Join a group to fit your particular astro-interest such as CCD or Film Astrophotography, Variable Stars, Solar, Seismological, Extra-Solar Planets, Occultations, Optical SETI, and more.

Access to Chabot's Science Library

Automatic membership in the

Astronomical League (a \$16 value)

***Astronomy and/or Sky & Telescope* subscription discounts (a \$10 value)**

+ Discounts on many items in the Sky and Telescope merchandise catalog



Join the Eastbay Astronomical Society, and begin expanding your knowledge of, and appreciation for, the night sky, our world, and the Universe!