



GLAST E/PO Program Status

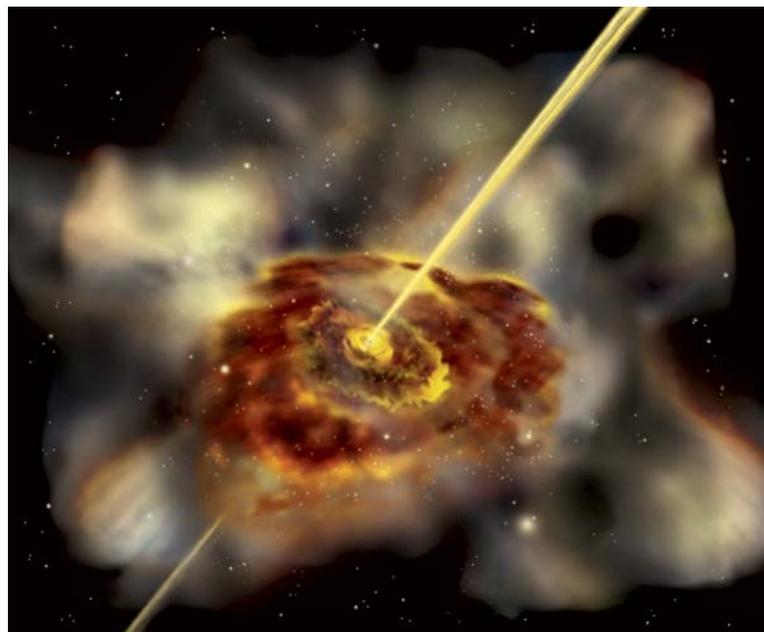
GLAST User's Committee 6/7/05

Lynn Cominsky
Sonoma State University



E/PO Work Breakdown Structure

- 1) Management
- 2) Assessment and Evaluation (WestEd)
- 3) Web based Materials
 - Web Site – Newly revised
 - *Space Mysteries*
- 4) Educator Training
 - Educator Ambassadors Program
 - Conference participation
- 5) Printed materials
 - TOPS Lesson Modules
 - Posters and Activities
- 6) SLAC Virtual Visitor Center
- 7) PBS documentary (Tom Lucas Productions)
- 8) Global (formerly GLAST) Telescope Network





GLAST E/PO Web Site

<http://glast.sonoma.edu>

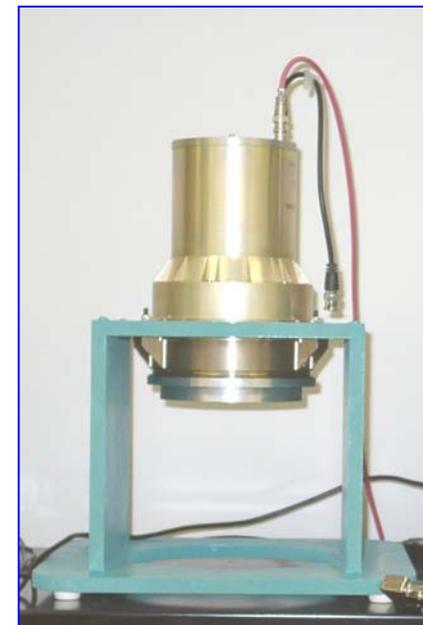


► Features image gallery of hardware photos of both LAT and GBM



I&T Tracker installation training at SLAC

An earlier engineering unit of the NaI detector



GLAST



- <http://mystery.sonoma.edu>
 - Dana Berry has done an animation of an AGN that will be used in the first GLAST Space Mystery
 - Comments are welcome!



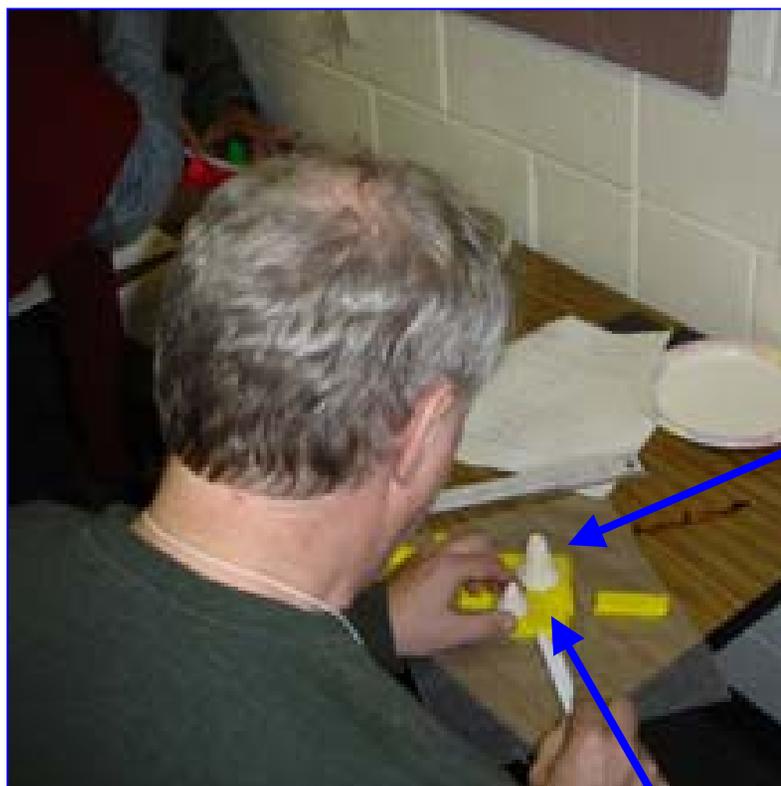
**Part of Early draft of
AGN animation for
Space Mystery**



3rd HEA AAVSO Workshop – 3/20-23/05

- ▶ Co-sponsored by Swift and GLAST – about 90 AAVSO members and educators in attendance
- ▶ Spear: Blazars of Our Times
- ▶ Plait: GTN – included live demo of GORT
- ▶ Plait also did public lecture “7 Ways a Black Hole Can Kill You”
- ▶ Cominsky, Silva, Plait and Graves did a workshop for educators using “Cookie Cutter Astrophysics” beginning photometry activity

Cookie Cutter Astrophysics



star

background

- Goal is to remove background from stellar image
- They also had to compare the brightnesses of the two stars in the “image”
- Tools: scale, ruler and plastic knife



EA Workshops in FY05

- The 10 GLAST EAs have presented **40** workshops to students, teachers and the general public in the past five months
- They have reached **1100** direct participants and have distributed over **1000** GLAST material items
- **New EA Sharla Dowding from Wyoming leads with 7 presentations, many others have 5 or 6 already (four are required per year)**
- The SCIPP Tesla Coil show has done **two** presentations to an additional **150** participants



New GLAST Exhibit Booth

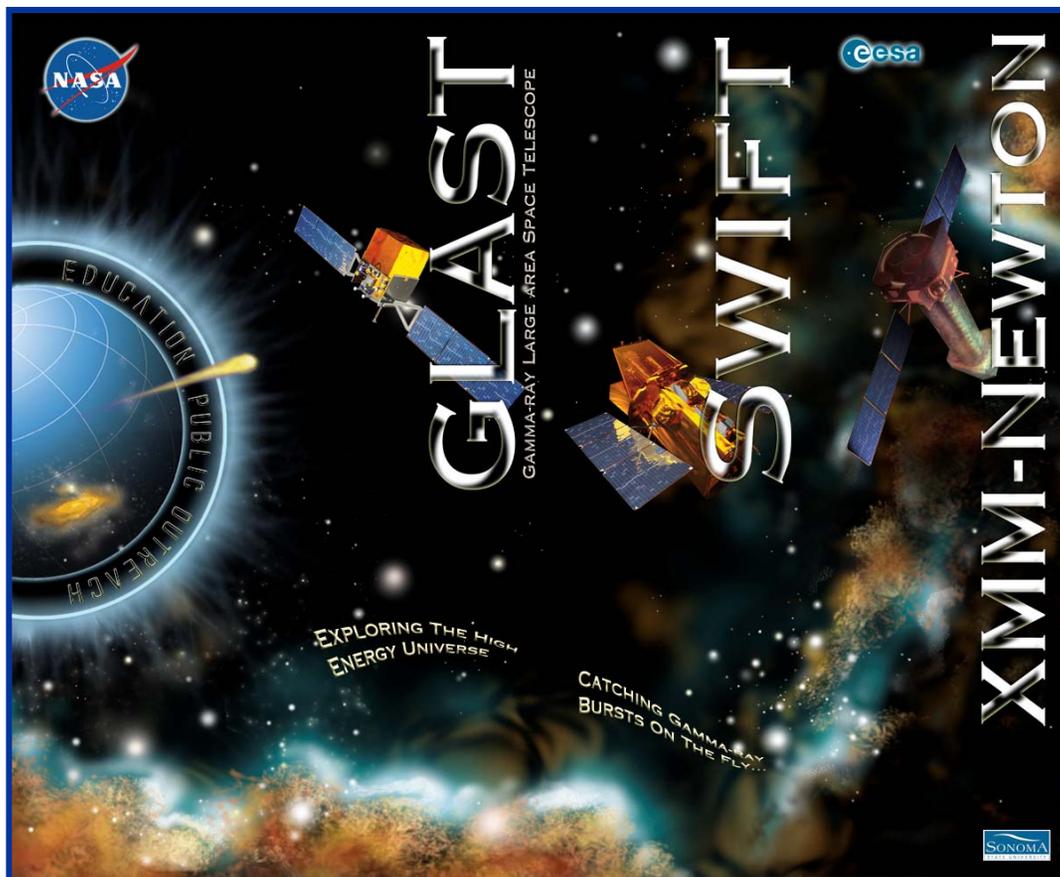


Debuted at AAS in San Diego in January 2005

GLAST



New E/PO Exhibit Booth



Will be used for teacher conferences



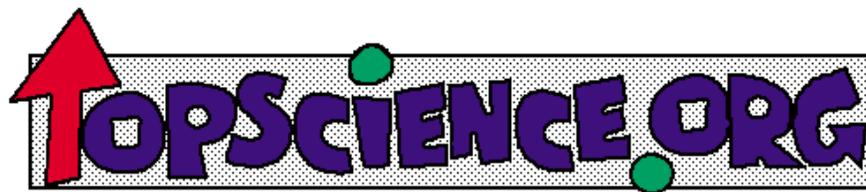
TOPS Learning Systems

▶ FAR OUT MATH

- Released in 2002
- Very widely in use now

▶ THUMBS UP: A Geometry of Space

- Now in review by WestEd
- Expected to be in print by the end of 2005



TOPS
LEARNING SYSTEMS

FAR OUT MATH 43
14 structured activities using very simple things
FOR GRADES 9-12

Produced in cooperation with NASA

ACTIVITY SHEET SERIES

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

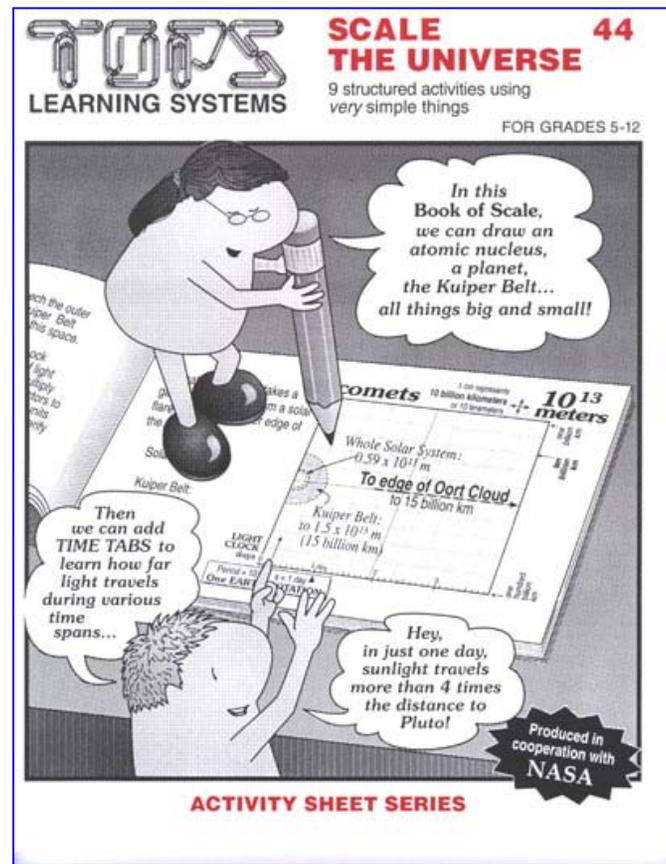
GLAST



TOPS Learning Systems

▶ SCALE THE UNIVERSE

- Now in print!
- Used in many ongoing workshops by EAs and for EYH
- Is the basis of mini-course that piloted with Roseland University Prep Charter School, will also be given to Boys & Girls Club this summer



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

GLAST



You are Here!

- Mini-course for 8th - 9th grade students
 - The Size and Scale of Things
 - How We See the Universe
 - Trip to the Sun
 - Solar System Travel Plans
 - Our Milky Way Galaxy and Beyond
- Uses Scale the Universe and GEMS

You Are Here

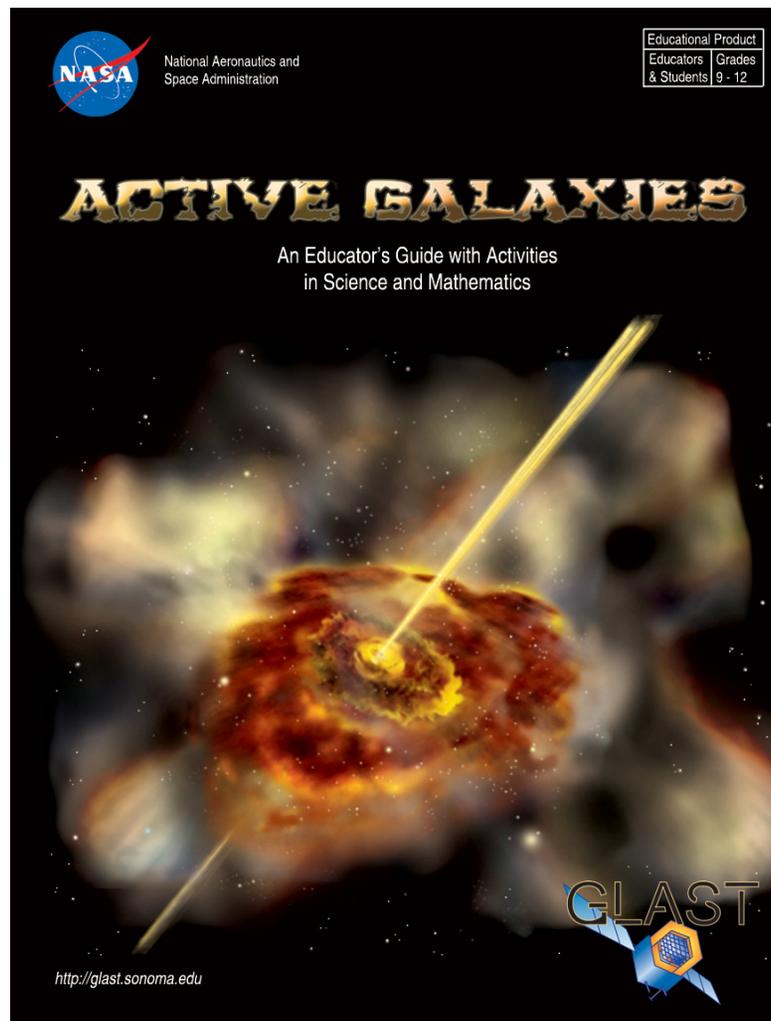


Come explore the very small to the very big with NASA. This six-session mini course will take you through a tour of the very microscopic and the very astronomic, viewing this, and everything in between with different eyes. Come and find your cosmic address in the Universe and see all of the many amazing things inside your atoms and above your head.



Active Galaxy Educator's Guide

- Released in 2002
- 3 activities
 - Building Perspectives with Active Galaxies
 - Zooming in on Active Galaxies
 - Light Travel Time and the Size of Active Galaxies
- Poster of AGN
 - Widely used in many venues
 - Shows different angles, different zooms





Other printed materials

- **New materials in development**

- GLAST Race Card Game – still in test
- AGN Pop-up Book – out for quotes

- **GTN Observing activities tutorials**

- Cookie Cutter Astrophysics – now on line
- Astrometry tutorial - – tested at EA training, being written up
- Jelly bean Spectroscopy – tested at EA training, being written up

- **Supernova Educator's Guide (Joint with XMM-Newton)**

- First activity now on line – Excel model of supernova lightcurve
- Second activity now in test – Crawl of the Crab
- Third activity in development – Heart of Supernova



Active Galaxy Pop-Up

Pop Up Model of an Active Galaxy

How the Galaxy Got Its Jets (story)

Tasty Galaxy Activity

How The Galaxy Got Its Jets

In a time long ago and far away, space was filled with families. These were not families as we know them on Earth. They were giant families of matter with distinct characteristics. They were all members of the Mighty Galaxy Community.

I am young Hydrogen. I like to make myself visible and watch what everyone else in the galaxy is doing.

Young Hydrogen

Helium is my name. I am a retired physicist. I am neutral and just like to hang out around the galaxy.

Helium

I am Mrs. Asteroid. Be alert! Asteroids can be violent and swook into things.

Mrs. Asteroid

We, the Planetary Society, are the smallest of the families, but we are important. We study other families and try to make sense of their travel.

Planetary Society

We are the Star Sisters, a large, long-lived family. Some of us are rare and cool Stars, and some of us are not.

Star Sisters

We are icy and travel fast! You may not see us very often, but we are the Comet Band.

Comet Band

We are the Mighty Galaxy Community, a very strong, powerful group.

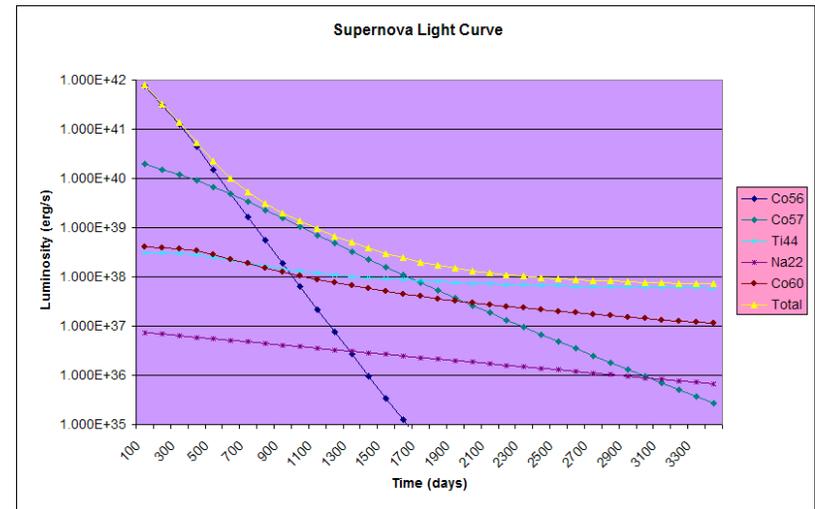
Mighty Galaxy Community



Supernova Excel activity

o Supernova Educator Unit – Activity 1

- o Excel spreadsheet that calculates supernova lightcurves
- o Students change isotopic abundances
- o Students learn to plot data linearly and logarithmically
- o Students match their models to real supernova data
- o Students discover the origin of heavy elements

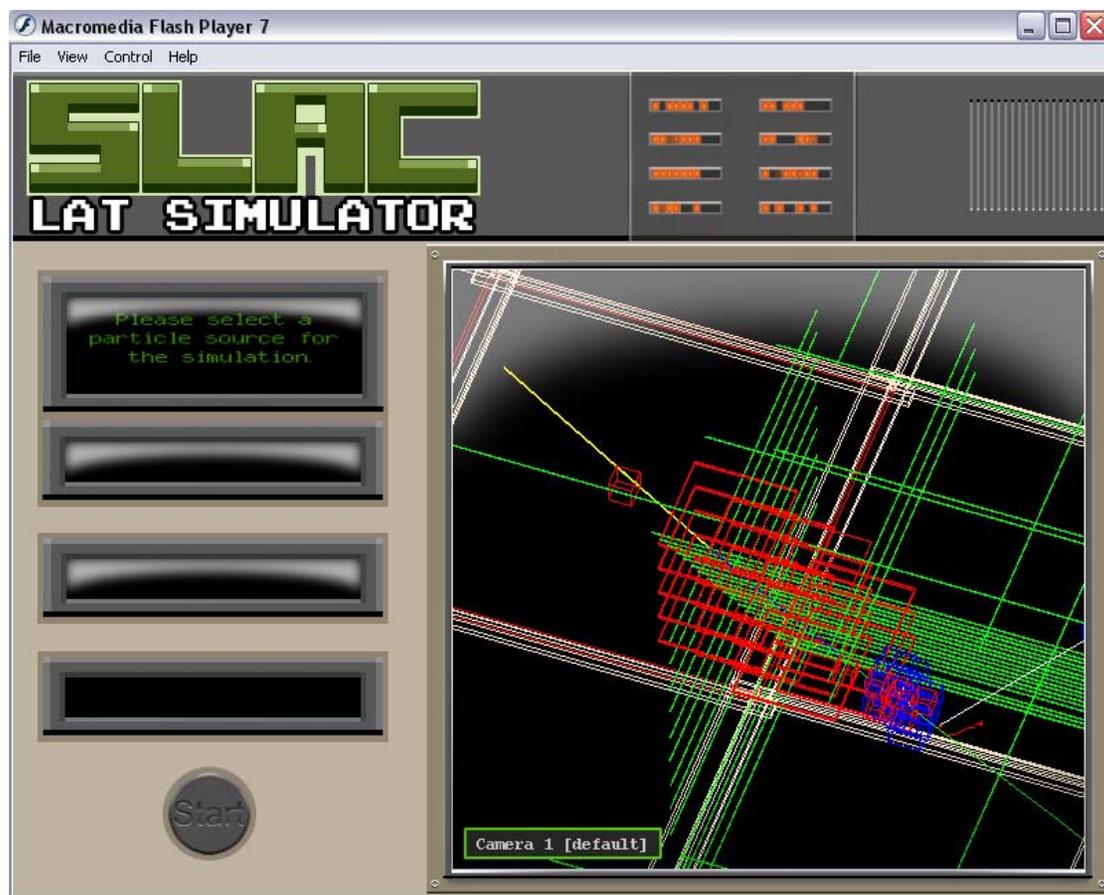


Time vs. Species (number)	Timestep for calculations (days)				
	100	200	300	400	500
Ni56	9.602E+50	1.115E+46	1.296E+41	1.505E+36	1.749E+31
Co56	3.369E+55	1.373E+55	5.596E+54	2.281E+54	9.295E+53
Fe56	4.897E+55	6.893E+55	7.706E+55	8.038E+55	8.173E+55

Part of Excel spreadsheet



SLAC Virtual Visitor's Center



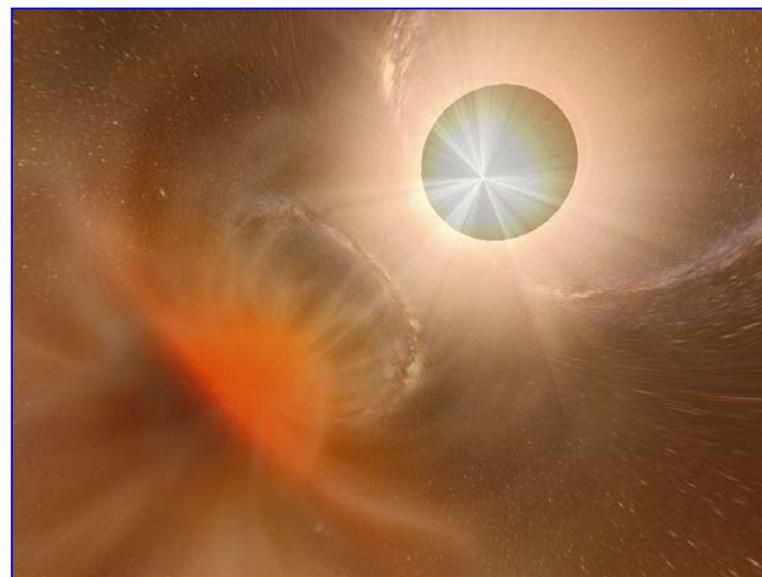
New console image – uses FRED to do simulation runs



PBS Television Special

- Tom Lucas productions - \$1M NSF grant to augment GLAST E/PO funds
- Program script now in development
 - NOVA Contract in negotiation
 - Should air early in 2006
- Planetary show in production

Still image
from black
hole flight
simulator
sequence





Global Telescope Network

- Website: <http://gtn.sonoma.edu>
 - Educator activities
 - Partner and Associate information
 - Tools for generating scripts and importing program objects into telescope control software
- **GORT NOW ONLINE!!**
- Remote demonstration at HEA
AAVSO meeting
- Scripted observations now running
- Mkn 501 campaign with VERITAS



**GLAST Optical
Robotic Telescope
at the California
Academy of
Science's
Pepperwood
Natural Preserve**



Global Telescope Network

- Simple image reduction and analysis of ~15 AGN to establish variability baselines
- Hands-On Universe
- AAVSO participation



- Elk Creek Observatory at Holton, Kansas HS
- Other new partners in Mexico, Finland, etc.



GTN Flyer and business cards

GIN

JOIN THE GTNI!
(GLOBAL TELESCOPE NETWORK)



Amateurs and professionals alike are invited to join astronomers around the world in exploring our universe. We're looking for participants to help acquire, reduce, and interpret astronomical data relating to some of the most exotic and enigmatic objects in the sky. This program supports several space observatories, including Swift, and XMM-Newton (both already in orbit) and the Gamma-ray Large Area Space Telescope (GLAST, due for launch in 2007).

The Global Telescope Network provides:

- Involvement for students, teachers, and amateur astronomers in cutting-edge astronomical research.
- Activities and instructional materials for a range of levels and interests.
- Mentoring in research practices, telescope use, data analysis and educational resources.

Partner Or Associate? That Is The Question.

Partners are individuals or groups who dedicate some portion of their time and expertise on observatory hardware they already own to regularly observe astronomical targets that are part of the GTN program. Partners may occasionally be able or willing to offer telescope time to GTN participants. Of course, partners may also be involved with analyzing GTN data. If you have a telescope that you think might be useful in the continuing quest to understand gamma-ray events, sign up at:
http://gin.sonoma.edu/public/join_partner.php



Associates are individuals, groups, or classrooms who dedicate some portion of their time to analyzing data taken with other people's telescopes. You can adopt your own program objects from our list, or request data for other objects by submitting a short proposal. If this sounds exciting to you, sign up at:
http://gin.sonoma.edu/public/join_associate.php

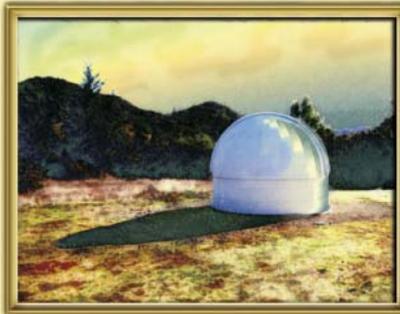


The Global Telescope Network provides:

- Blazars: supermassive black holes in the cores of distant galaxies that shoot out wildly variable gamma-ray jets
- Gamma-Ray Bursts: powerful explosions that occur at random locations in the sky
- Polars: binary systems with flaring highly-magnetic white dwarfs

The GTN Program Objects

For additional information visit the website:
<http://gin.sonoma.edu>
or send email to
gin-info@gin.sonoma.edu



GIN
Global Telescope
Network

- First distributed at AAVSO



GLAST Public Relations - Update

- “Giveaways” at science meetings
 - Out of stickers and flashlights
 - A few more Magic cubes left
- GLAST public brochure –
 - Now in print
 - Handed out at AAS
- Will be reprinting more posters and stickers when new PR funds arrive





E/PO Summary

- **GLAST E/PO is exciting the public and students of all ages**
- **We meet all requirements for NASA E/PO**
- **We are on budget and moving ahead on all scheduled items**
- **Over 3500 teachers have been trained in 2004**
- **GLAST E/PO materials are in the hands of over 15,000 teachers nationwide**