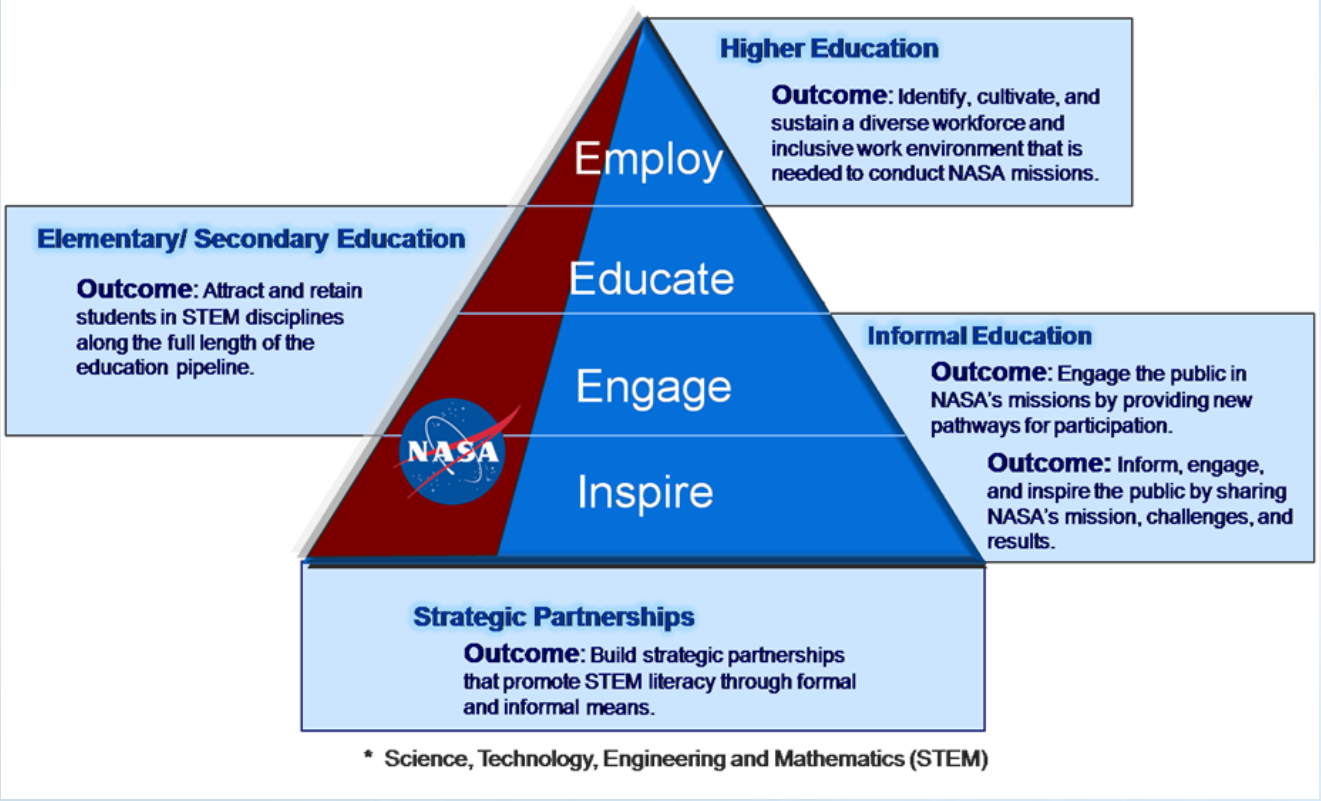
Education and Public Outreach Program Update
Fermi User's Group 7/20/12

Prof. Lynn Cominsky

Sonoma State University

NASA Education Framework



- Blue area is for strategic partners such as SSU E/PO

Red area is designated recommendations for NASA Center Education offices and Office of Education

E/PO group News

- Fermi E/PO proposal for Senior Review was very well received
  - There was only valid and significant comment – more involvement by mission scientists in E/PO efforts was needed
  - I will send the proposal, the review and the response to the review to anyone on the FUG that would like to read them
- Due to successful launch of NuSTAR, and other new funding to SSU, I have managed to hire back Logan Hill, who was laid off last year at this time

Cosmology Course Development news

- Module 1 is now undergoing field testing
- Includes the first five chapters
  - Size and Scope
  - Light and Telescopes
  - Motion and Time
  - Measuring Cosmic Distances
  - Special Relativity
- For each chapter, also:
  - Teacher resources
  - Homework problems
  - Learning Objectives
  - Educational Research

Access codes for field testing are available, just ask!

Cosmology Course Development news

- Chapter 6 (Classical Physics: Gravity and Energy) is complete, but not yet at the publishers
  - Will be piloted by Educator Ambassadors next week
- Chapter 7 (Dark Matter) is drafted, and we also have outlines for the remaining chapters
- In addition, three papers have been written for Astronomy Education Review, describing our education research that underlies much of the pedagogy for the curriculum. The first has just been submitted, and the other two should follow soon.

Sample pages from eBook

- Chapters 1-5 have a total of 336 pages

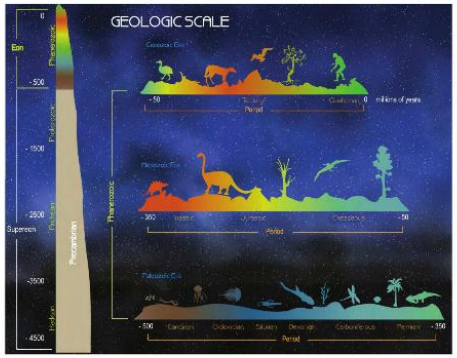


FIGURE 3.8: The names of the geologic epochs and their corresponding ages in millions of years. The spike-scale on the left shows the major epochs from Earth's beginning to present day, while the colorful Phanerozoic section on the right of the graph corresponds to the tip of the spike-scale. *Credit: NASA/SSU/Aurore Simonnet.*

Half-Life Activity

Play Activity | View My Answers | Activity Complete

In the activity below, you are given a set of 225 red atoms. These atoms have a half-life of 5 seconds, and they decay into blue atoms.

1. Click the "start" button, and you will see the atoms decay over one half-life. At the end of this cycle, the counter will let you know the number of blue and red atoms that are now in the sample, as well as the percentage of red atoms remaining. There will still be a total of 225 atoms.
2. Estimate how many the red atoms will be left after another (second) half-life. Make your selection among the possible ranges given, and then click the "continue" button to observe the second half-life. If you select the wrong answer, you should review the section on half-lives before continuing.

Save

3. Next estimate the number of blue atoms that will be present after a third half-life is complete. Click the "continue" button to observe the third half-life.

Save

4. Resolve any discrepancies between your predictions and your observations.

Save

Radiometric Dating

1. Can carbon dating be used to measure the age of a dinosaur? Explain.

Save

2. A 10.0 gram sample of ^{226}Radium which has a half-life of 1,660 years is left to decay. How much of the original sample is left after one half-life?

Save & Check | View Answer

Cosmology Education Research

- Chicago State students (under the direction of Kim Coble) have presented at many conferences, including the June 2011 AAS, where Melissa Nickerson won the Chambliss award.

L to R: Carmelita Camarillo, AAS VP Lee Anne Willson, Virginia Hayes and Melissa Nickerson

Multiwavelength Professional Development

- SSU has again hosted an online professional development course for educators: *NASA's Multiwavelength Universe* during June 25-July 13
- Cominsky is instructor of record (again)
- This is an Astrophysics-division wide collaboration, facilitated by the Forum (STScI)
  - Fermi, Swift, XMM-Newton, NuSTAR (SSU)
  - SOFIA, Kepler, (SETI Institute) - WMAP (Adler)
  - WISE (UCB CSE) - Hubble (STScI)

Fermi Educator Ambassadors 2012

Jeff Adkins Deer Valley High School Antioch, CA 	Teena Della Terry Fox Secondary Port Coquitlam, British Columbia * 	Michiel Ford Kickapoo Nation School Powhattan, KS * 
Mandy Frantti Munising Public Schools Munising, MI 	Mary Garrett Georgia * 	Linda Smith Paulsboro Public Schools Pittsgrove, NJ 
Daryl Taylor Greenwich High School Greenwich, CT * 	Pamela Whiffen Mohave Middle School Scottsdale, AZ 	Bruce Hemp Fort Defiance High School Fort Defiance, VA 
	Christine Royce Shippensburg University Shippensburg, PA * 	

* 10 years

Educator Ambassador Stats

- Through FY11, the *Fermi*-funded EAs, together with SSU E/PO personnel, have directly trained over 31,000 students and teachers through over 370 training events.
- The EA program, as a whole, has directly trained over 57,000 teachers and students across North America since 2001.

Astro 4 Girls

- During March 2012, two Fermi EAs helped to pilot a new program aimed at reaching girls through public libraries

Educator Ambassador Training

- July 23-27, 2012 at SSU
- We will be emphasizing gravity in two-day “mini-course” with help from LIGO, GPB and GRAIL
- Also science updates from Fermi, Swift, NuSTAR and Planck
- Strategic planning, a review of the EA program at 10 years, and more!

Other SSU Workshops & Talks

- Fermi-content talks by Cominsky
  - ASP workshop demonstrating Cosmology course – August 2011
  - Radio interview with local PBS – December 2011
  - AAS workshop for scientists interested in E/PO – January 2012
  - Communicating Science to the Public – panel at UG Women in Physics conference at Stanford – January 2012
  - Expanding Your Horizons – two workshops for 8th grade girls – April 2012
  - Illinois State Board of Ed course telecon with teachers – July 2012
- Fermi-related talks/demos by Kevin McLin
  - Petaluma Historical Museum BEYOND exhibition – 6/25/11
  - Rotary breakfast meeting – 6/22/11
  - Noyce scholars demo of Fermi activities – July 2011
  - Using Astronomy to teach UG Physics conference – July 2011
  - Exploration Station about Gamma-rays at AGU – December 2011
  - Gordon Research Conference – June 2012
  - Illinois State Board of Ed course telecon with teachers – July 2012

Conference Presentations since 6/11

- Investigating Undergraduate Student Ideas about Cosmological Concepts, K. Coble, L. E. Trouille, J. M. Bailey, C. T. Camarillo, M. D. Nickerson, G. L. Cochran, V. L. Hayes, K. M. McLin, L. R. Cominsky, 2012AAS...22010801C
- Student Ideas about Cosmological Concepts: Age, Expansion, and the Big Bang, L. Trouille, K. Coble, C. Camarillo, J. M. Bailey, M. D. Nickerson, G. L. Cochran, V. L. Hayes, K. M. McLin, L. R. Cominsky, 2012AAS...22010803T
- Student Ideas about Cosmological Concepts: Structure and Distances, C. Camarillo, K. Coble, L. E. Trouille, J. M. Bailey, M. D. Nickerson, G. L. Cochran, V. L. Hayes, V. L. Hayes, K. M. McLin, L. R. Cominsky, 2012AAS...22010802C

Other Events

- USA Science and Engineering Festival – April 2012
  - 150,000 estimated attendance
  - Fermi booth staffed by many scientists, Cominsky and Laura Chase as Alkina
  - Dave Thompson presented at the Hyperwall



E/PO workshop in Alaska

- AAS June 2012 – Fermi's "Build your own pulsar" Activity

Global Telescope Network 7/12

- We now have 37 members in the GTN
- We have five high school students this summer (two are volunteers) who will be working on analyzing telescope data from GORT and other GTN facilities (PROMPT in Chile)
- We have bought a new dome for GORT as the old one no longer rotates reliably. We expect delivery on 7/28. It is the same kind used by PROMPT in Chile.

E/PO Summer Interns - 2012

- Brodie Vivio – Montgomery High School
- Adrian Chan – was volunteer last summer, Pathways Charter School
- Joanna Ortiz – Roseland University Prep
- Volunteers
  - Audrey Chan (Pathways Charter HS)
  - Cody Darling (Petaluma HS)

LAT Simulator returns!

- We discovered that our LAT simulator activity disappeared from the SLAC site during an upgrade
- We recovered it, upgraded the graphics from GLAST to Fermi and it now lives again at: http://fermi.sonoma.edu/multimedia/latsim

Next E/PO Plans

- Fermi factsheet update
- New litho set featuring first sky map and discoveries for each type of object – not yet
- *AER publications in progress: Educator Ambassador program, Black Hole show audience learning*

PR Update

- Cominsky began tweeting as @NASAFermi

in 12/11 and has tweeted more than 40 times to over 9600 followers

- One popular tweet/story featured a blog post about the “sound of a GRB”
  http://blogs.nasa.gov/cm/blog/GLAST/posts/post_1340301006610.html
- Some Fermi stories are now available for the iPad through the NASA Visualization Explorer
  http://itunes.apple.com/us/app/nasa-visualization-explorer/id448700202?mt=8
- We are moving ahead with Google+ as part of a HQ-led effort

PR Update

Press releases and web features since 6/11:

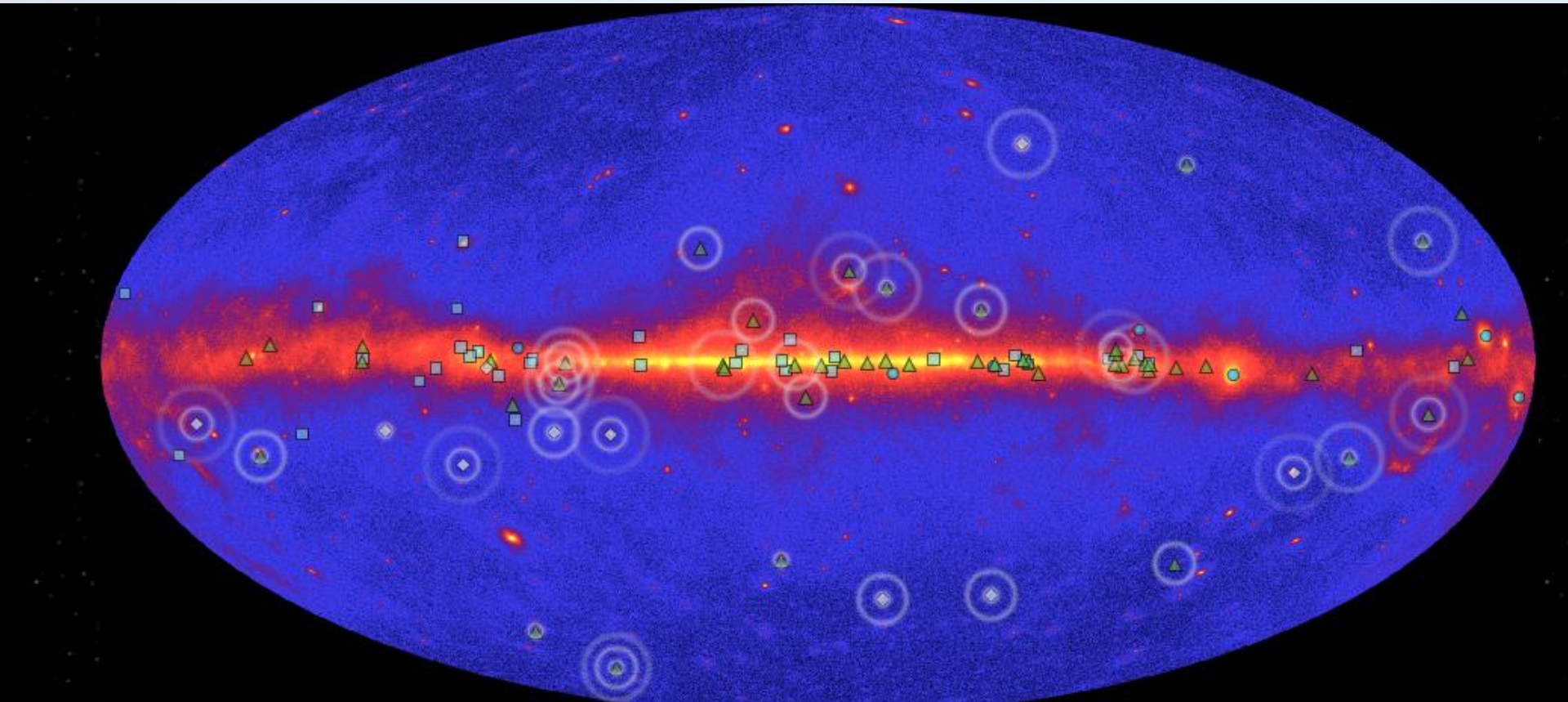
- 6/29/11: Odd Couple' Binary Makes Dual Gamma-ray Flares
- 9/9/11: Fermi's Latest Gamma-ray Census Highlights Cosmic Mysteries
- 11/3/11: NASA's Fermi Finds Youngest Millisecond Pulsar, 100 Pulsars To-Date – media telecon
- 11/28/11: In The Heart Of Cygnus, NASA's Fermi Reveals A Cosmic-ray Cocoon
- 12/13/11: NASA's Fermi Shows That Tycho's Star Shines in Gamma Rays
- 1/10/12: NASA's Fermi Space Telescope Explores New Energy Extremes – AAS press conference
- 4/2/12: Fermi Observations of Dwarf Galaxies Provide New Insights on Dark Matter – APS press conference
- 6/11/12: NASA's Fermi Detects the Highest-Energy Light From a Solar Flare – AAS Press Conference

PR Update

Fermi Pulsar Explorer – Kevin John

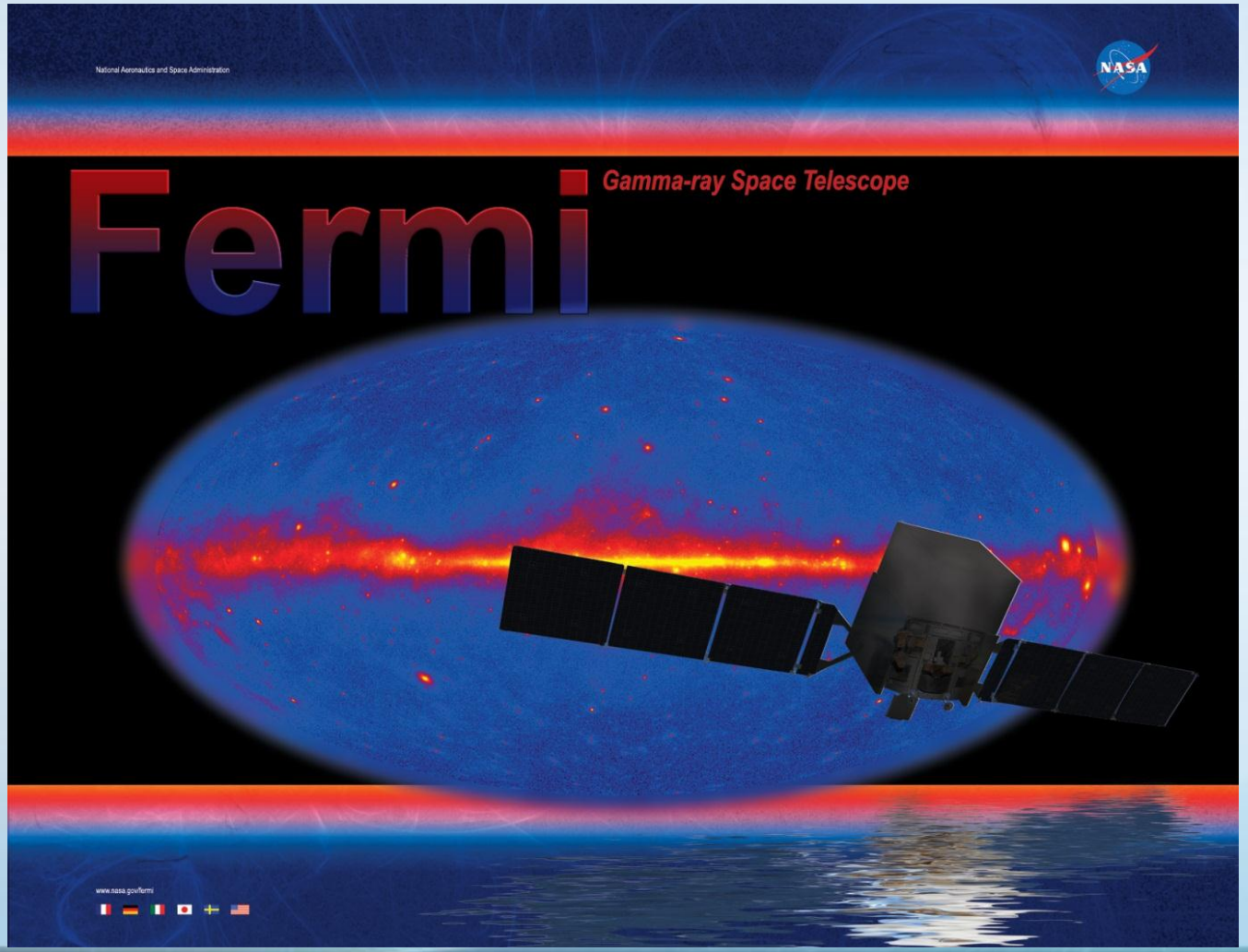
http://www.nasa.gov/externalflash/fermipulsar/

Used in press conference on 11/3/11



PR Update

New Fermi booth graphics – Aurore Simonnet



PR Update

New handouts feature Fermi/LIGO collaboration

- Thousands handed out at AAS, LIGO Science Collaboration meeting and USA Science and Engineering Festival

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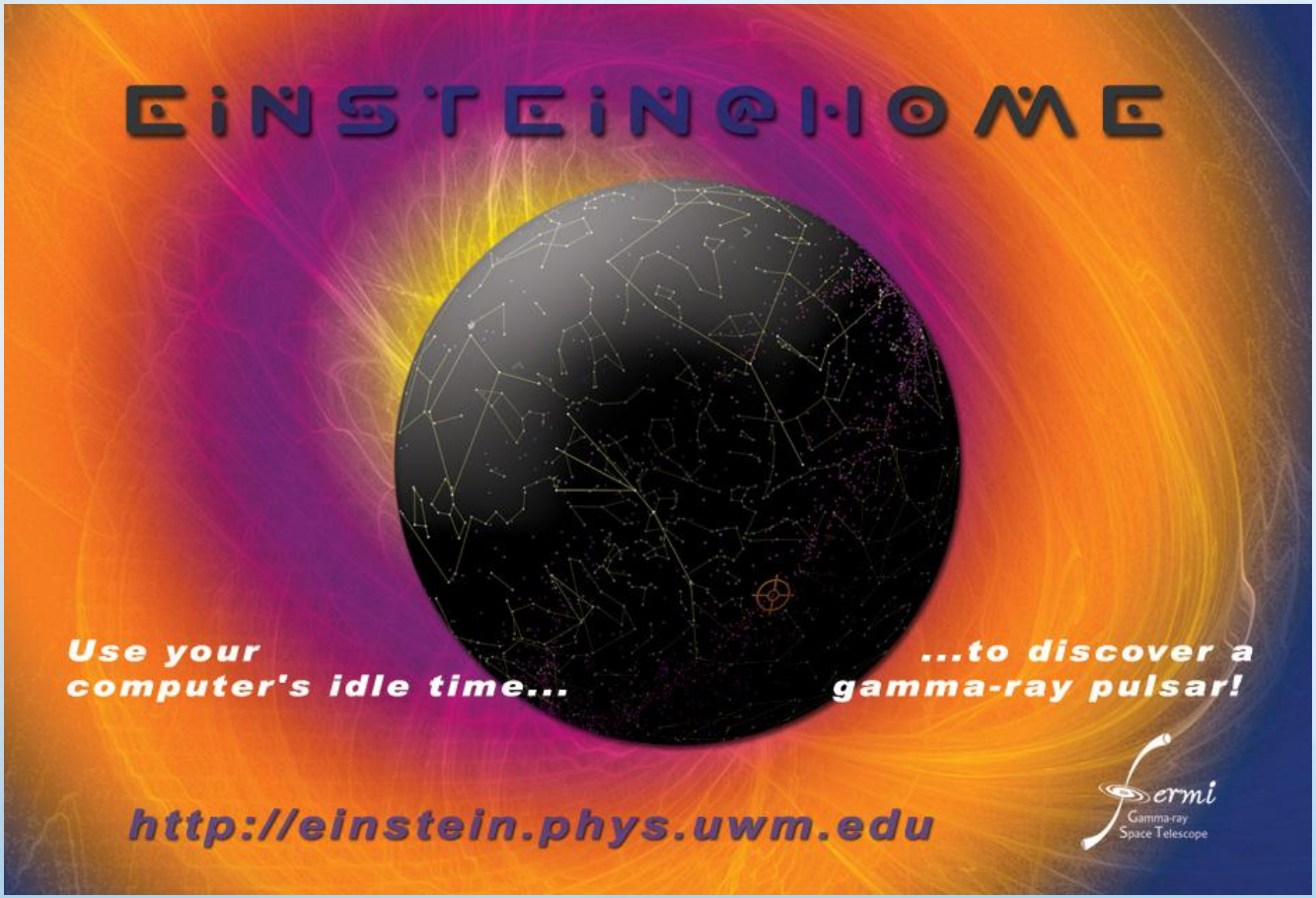

Future PR projects

- Working on possible press conference about EBL results
- Possible gamma-ray MSP story
- New TGF results
- Feature on collision-avoidance maneuver
- Fermi pulsars in Einstein@Home
- Please do not discuss these plans outside of FUG, they are all in progress.