Astronomers using the VERITAS telescopes to detect some of the highest-energy photons in the Universe need your help! These photons are gamma-rays that originate in astrophysical environments like the expanding blast waves thrown out by supernova explosions, or from powerful streams of material that flow from the cores of active galaxies at speeds close to that of light. Muons (a particle like an electron, only heavier) are a prominent background contaminant when observing very-high-energy gamma rays on earth. They leave a distinctive ring-like shape making them obvious to the human eye, but incomplete or truncated rings can appear very gamma-ray-like to automatic analysis algorithms. We need your help to identify camera images that contain muon rings so we can teach computers to better identify such images and efficiently filter out those pesky muons that are masquerading as gamma rays.

Find out more at Muon Hunters
VERITAS Video

Videos on youtube can be found [here](https://www.youtube.com).

Media

Here are copies of the new (2011) signs posted outside the FLWO Visitors Center close to the T1 telescope (click on the figures for full-size versions):
Observing Gamma Rays

Miles overhead, very-high-energy gamma rays enter the atmosphere and collide with all the molecules. These collisions produce a shower of secondary particles that move towards the ground at nearly the speed of light. The VERITAS camera image the faint blue/green glow emitted by these “air showers”. This optical Cherenkov light lasts only a few milliseconds of a second.

The telescope in front of you is one of four in an array. Using these telescopes rather than just one enables the detection and energy of such gamma rays to be determined more accurately and to reject numerous charged particles that act like noise in the observation.

Each telescope views the air shower from a different perspective, and the resulting images have different orientations. The position is thereby of a gamma-ray source can be determined from the intersection of lines drawn through each image.

The complete spectrum of visible and invisible light extends far out on both sides of visible light from radio waves to gamma rays. VERITAS studies invisible very-high-energy gamma rays with millions of times more energy than visible light.

Gamma-ray astronomy has opened a new window on the universe. Thanks to gamma-ray telescopes such as VERITAS, we can now study theories of high-energy invisible light produced in the most extreme environments in the Universe such as black holes, supermassive and starburst galaxies.

The Crab Nebula is a supernova remnant produced by a stellar explosion seen in 1054 AD. A thin core on a period, supermassive massive core of material is formed and the supernova remnant generates gamma rays. The Crab Nebula is a source of gamma rays so bright and intense it is used to calibrate the VERITAS instruments.

Younger clusters in the universe contain light elements such as hydrogen and helium. These elements produce shorter and less energetic emissions of particles and other stellar winds. The collision between these winds and the surrounding gas may produce gamma rays.

Starburst galaxies, the M82, have much more nova events than our Milky Way. As such the most massive, these nova events produce a supernova remnant. These shocks can produce gamma rays. The VERITAS instrument can detect these gamma rays in their energy range.

The gravity of the very massive supermassive black holes in active galactic nuclei and in the central regions of elliptical galaxies can produce gamma rays. VERITAS is able to detect these gamma rays and map their locations.
If you have any questions on astronomy or astrophysics in general please follow one of these links:

- NASA - Ask an astrophysicist
- Ask an astrophysicist - specialising in cosmic-ray, gamma-ray and X-ray astrophysics
- Ask an astronomer
- McDonald's Observatory ask an astronomer
- Curious about astronomy ask an astronomer
- Cool cosmos ask an astronomer
- Ask an astronomer @ UC Berkely
- Lick Observatory ask an astronomer
- NRAO ask an astronomer
- Harvard CfA resources for amateur astronomers
- Phil Plait's Bad Astronomy page