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.
VERITAS Video

Videos on youtube can be found here.

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 air molecules. These collisions produce a shower of secondary particles that move towards the ground at nearly the speed of light. The VERITAS camera detects the faint blue/white light given off by these “air showers”. This patch of Cherenkov light lasts only a few milliseconds of a second.

The telescope in front of you is one of four in an array. Using four telescopes rather than just one enables the direction and energy of each gamma ray 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 the sky 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 in both sides of visible light from radio waves to gamma rays. VERITAS studies invisible very-high-energy gamma rays with energies of less than visible light.

Gamma-ray astronomy has opened a new window on the universe. Thanks to gamma-ray telescopes such as VERITAS, scientists can study theorists high-energy invisible light produced in the most extreme environments in the Universe near objects such as black holes, supernovae and starburst galaxies.

The Crab Nebula is a supernova remnant produced by a stellar explosion seen in 1054 AD. Its core is a tiny, super- dense remnant composed of neutron stars which streams a highly energetic beam of charged particles. The particles of the beam and the supernova remnant generate gamma rays. The Crab Nebula is a source of gamma rays at all stages and allows it to be studied with the VERITAS instruments.

Throughout the universe, invisible light consists of light that produce energetic and ionizing radiation of material (shocked stellar winds, the collision between these winds and the surrounding gas) and can produce gamma rays.

Starburst galaxies, the NE2, have much more gamma rays than ordinary stars. These can produce very bright and ionizing radiation of material (shocked stellar winds, the collision between these winds and the surrounding gas) and can produce gamma rays.

The gamma-ray sky is an invisible source of beautiful characteristics, especially for potential cosmic-ray sources. Gamma rays from the universe, such as the Crab Nebula, are detected by VERITAS.
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 @ UCBerkely
- Lick Observatory ask an astronomer
- NRAO ask an astronomer
- Harvard CfA resources for amateur astronomers
- Phil Plait's Bad Astronomy page