Outline

• Brief Introduction
• Upgrade
• Benefits
• conclusions
VERITAS is a Ground based observatory
It comprises an array of four 12m optical reflectors
VERITAS continued.....

- 499 PMTs (Photonis XP 2970/02)
- 3.5° field of view
- 500 MSample/s flash ADC (2 ns)
- Energy range is 100 GeV - 50 TeV
Array of photomultipliers in the focal plane of optical reflector record the image of air shower.
Looking Ahead

• Current Photonis PMT XP2970 ~18-22% peak Quantum efficiency (QE)
• New Hamamatsu PMT R10560 ~34-40% peak QE
Quantum efficiency

It is defined as the ratio of number of photoelectrons emitted to the number of photons incident upon the photocathode.
Gain stability of pixels

Run: 52604 Event: 18 Type: 1 (0) GPS: 2010 290 : 10 : 25 : 2.46653
Max channel 500
Num Samples 20
Num Trigger 492
Num Tubes 488
Num LowGain 4
Num Dead 11/10

GEO: c_x=0.00,c_y=-0.00,dist=0.00,length=0.837,width=0.829,α=60.69,size=309178,loss=0.17

D. B. KIEDA
Benefits of replacement

- Better collection efficiency leads to Increase in the effective area at lower energy
- Pulse shape results in Better discrimination of Cherenkov signal against the background photons
Effective area
Pulse shape

- R10560 has a full width at half maximum (FWHM) of 4.2 nanoseconds.
- 40% narrower than the pulse shape of the Photonis XP2970 (6.8 nanoseconds).

Conclusions

- We are spending almost 6 weeks this summer in upgrading the telescopes
- Get the data with the new hardware and with better efficiency