

THE COSMIC RAY

TELESCOPE

(MUON DETECTOR)

- Goal: To measure muon production altitude

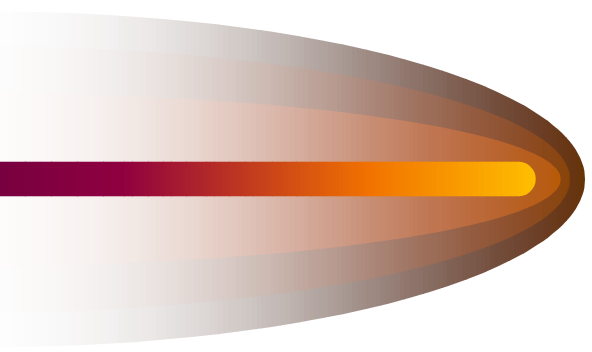
Muon Production



- Muon production altitude
- High energy protons (Cosmic Rays)
- Secondary particles
- Muons
- half life

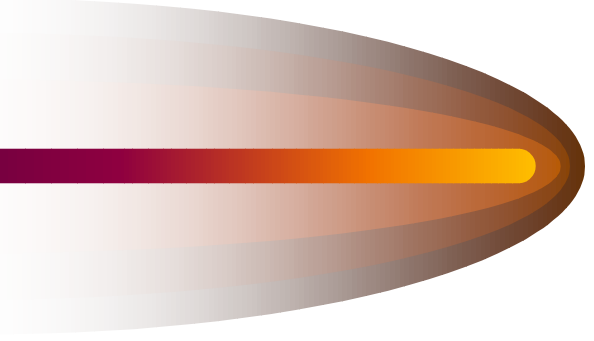
Muon Detection

- Scintillator Paddle
- Material
 - transparent polystyrene plastic
 - fluor



Muon Detection

- Muon interaction
 - excitation
 - photon emission

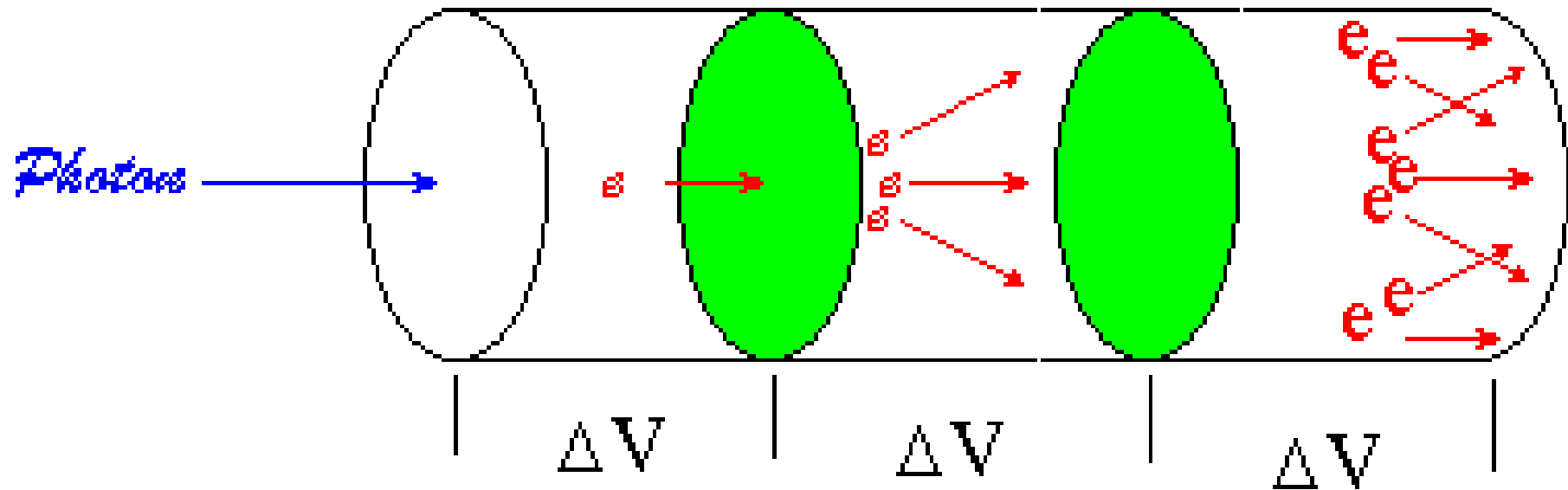


Muon Detection



- Photomultiplier tube (pmt)
 - photoelectric effect
 - photoelectron multiplication
 - Amplified signal

PHOTOMULTIPLIER TUBE



Problem Solving



Emitted photons to pmt



- Total internal reflection
 - shape
 - polishing
 - aluminum foil
- Glueing

Emitted photons to pmt



False signals

- Light shroud
- Double paddles



Soldering / “Board Stuffing”



- Reading Schematic
- Solid connections (avoiding open and short circuits)

Muon Production

Altitude

- Scintillator orientation and double paddles