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

- Moun interaction
  - excitation
  - photon emission
Muon Detection

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

Photon → ΔV → ΔV → ΔV

Electrons (e)
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