

Sensitivity of the Tibet hybrid experiment (Tibet-III + MD) for primary proton spectrum between 30 TeV and a few hundreds of TeV's

#384

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# Energy Spectrum of Protons

- ✓ Spectral fine structure confirmed up to 10TeV
- ✓ Multiple spectral shapes reported beyond 1 PeV
- Further measurements of the spectrum in the tens to hundreds of TeV region are required for discussion

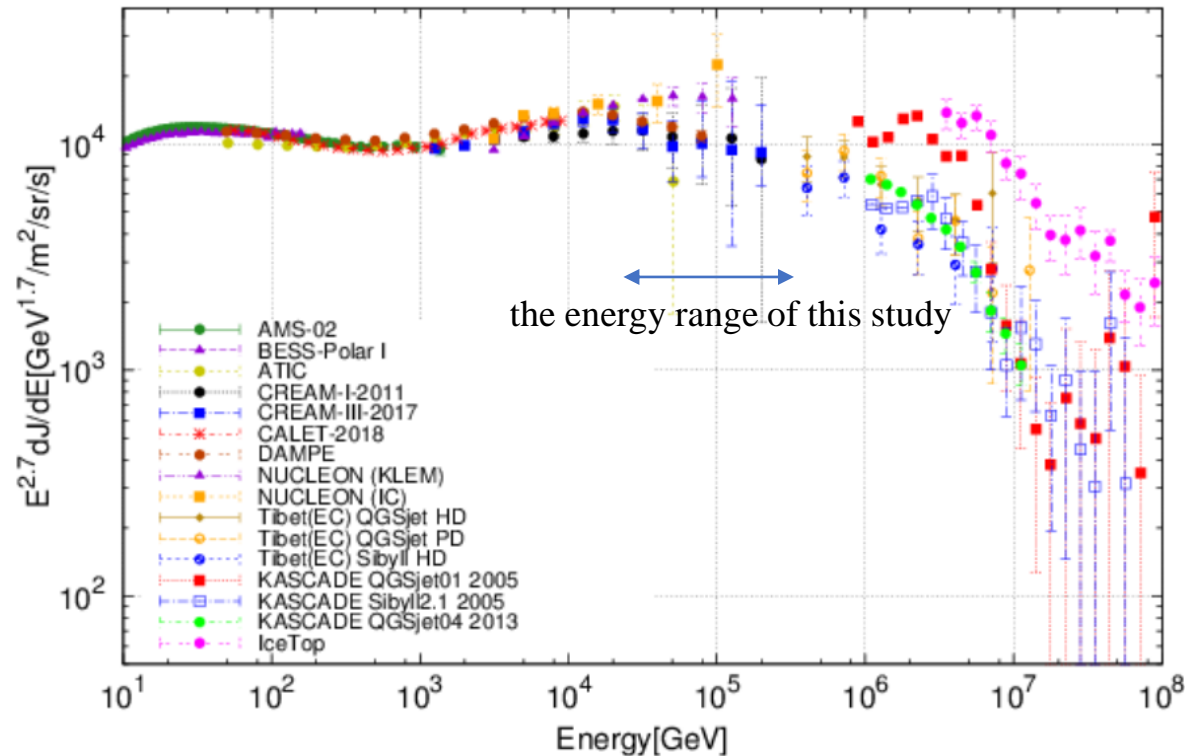


Figure 1: Energy spectrum of protons

# A method of Proton selection using muon particles

-Using the differences of the number of muons in the air shower detected by Tibet-III & MD  
 →A cutline was defined to select the proton events with 90% purity.

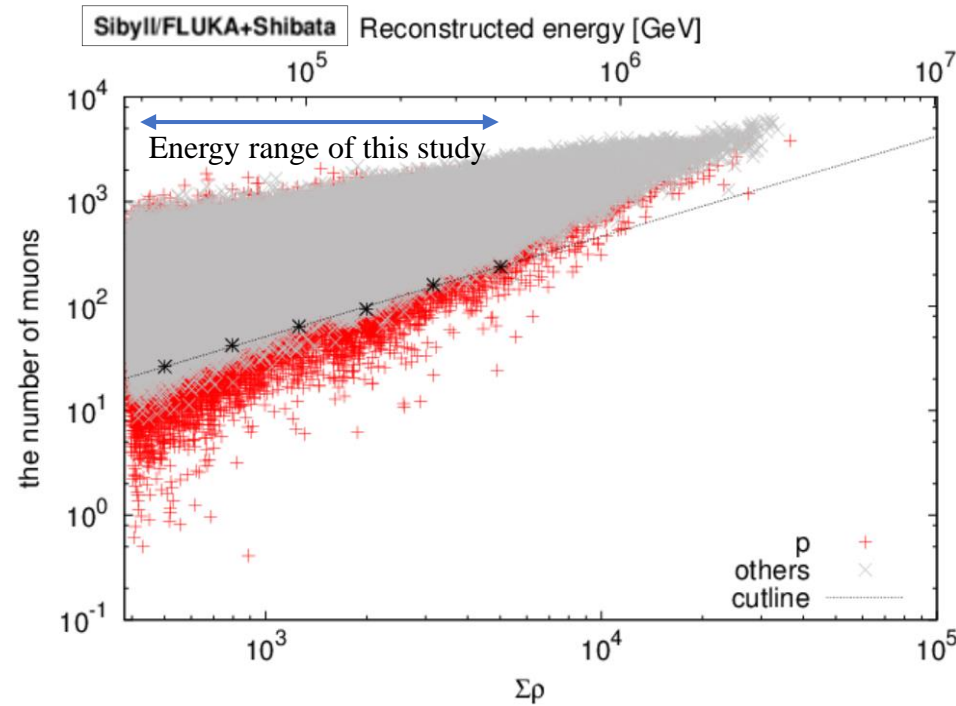
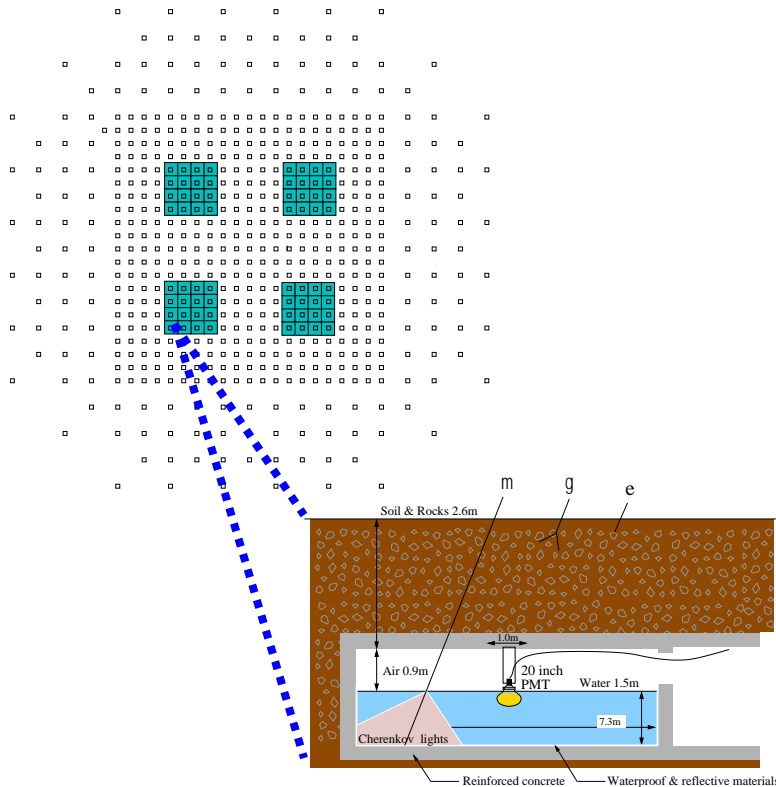


Figure 3: Scatter plot of  $\Sigma\rho$  and # of muons

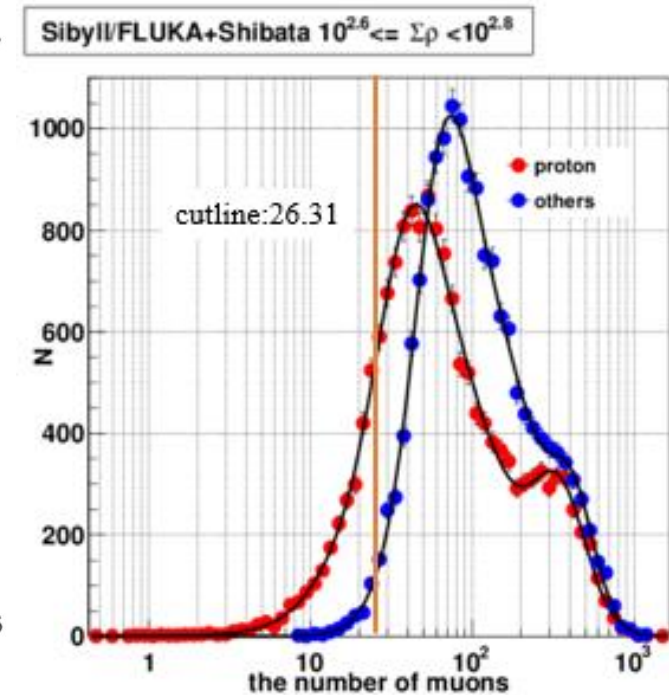


Figure 4: Muon histogram

Figure 2: Schematic view of Tibet air shower detector. Tibet-III air shower array (upper) and MD (lower)

# Reconstruction of proton spectrum

- Applying the muon cutlines of 4 MC datasets based on different assumptions to Sibyll/FLUKA+Shibata model
- Systematic error among these models is up to  $\pm 36\%$

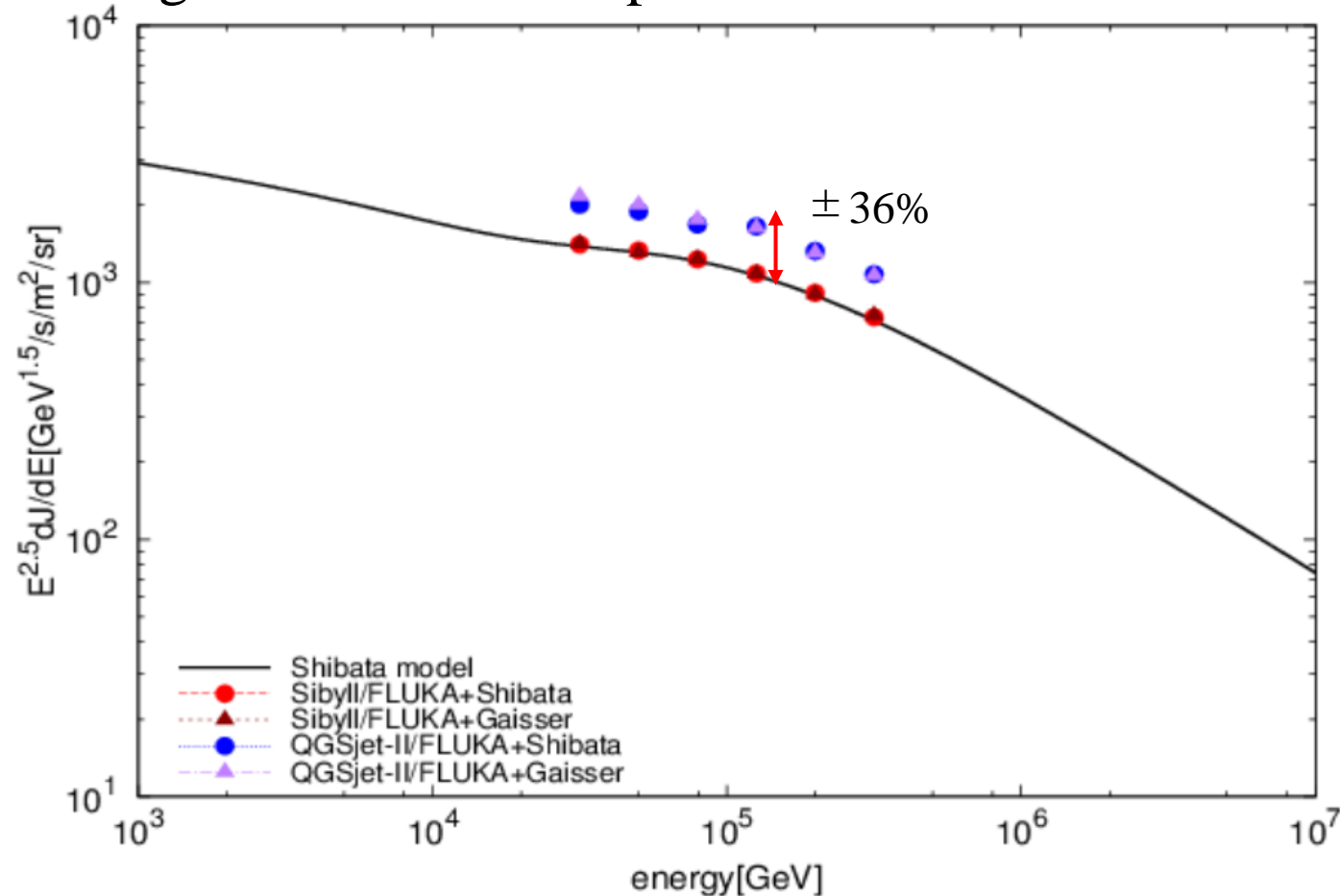


Figure 5: Reconstructed energy spectrum of protons (MC)