Energetic Pions, Differences For The Hadronic Interaction Models

Motivation

“Effect of the uncertainty in the hadronic interaction models on the estimation of the sensitivity of the Cherenkov Telescope Array” by Michiko Ohishi et al.

Predicts “~30% differences in the estimated gamma-ray sensitivity in the 1 - 30 TeV region”

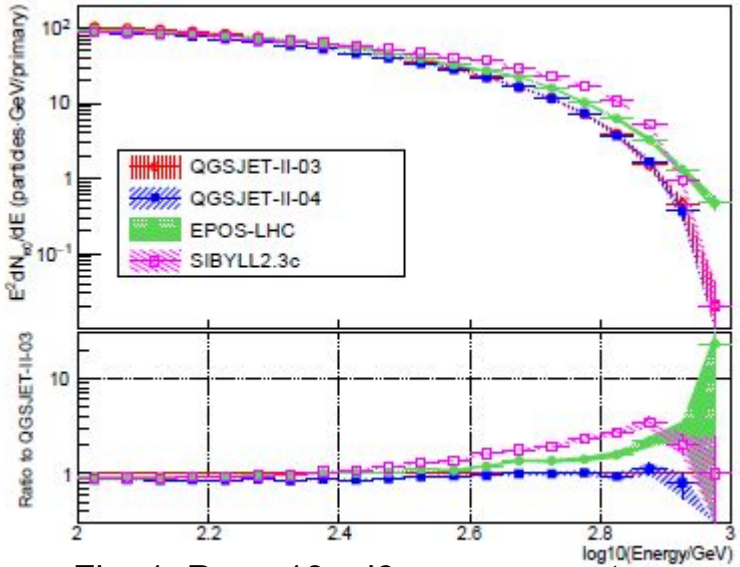

Fig. 1. Page 10, pi0 energy spectra

Goals:
-Recreate the plots and methods
-Propose accurate uncertainties for background events dependent on the models
-include updated/different models

The Main Plots

How are they created and weighted?

What regions are interesting?

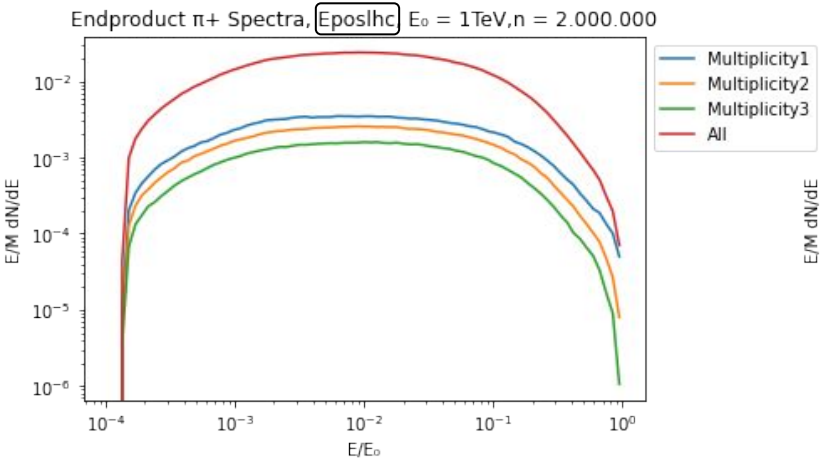

Fig. 2.

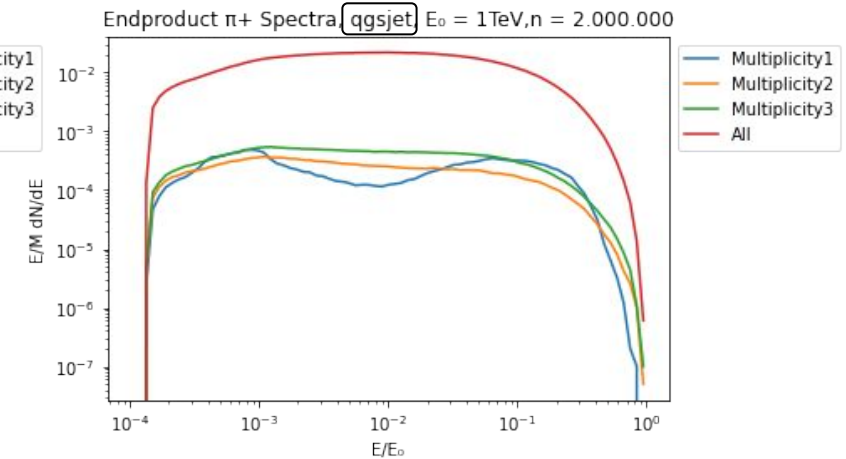

Fig. 3.

“Multiplicity of an event”: The number of end product +ve pions created by an interaction event

Changing behaviour for minimal decay length

-High and Low E/E_0 regions dominated by the decay of resonances (at least using Eposlhc)

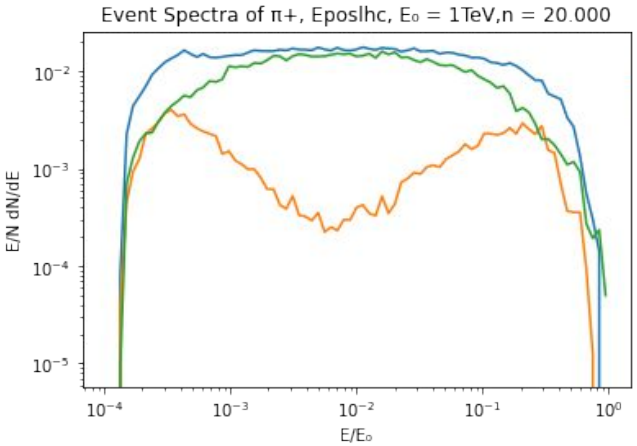

Fig. 4.

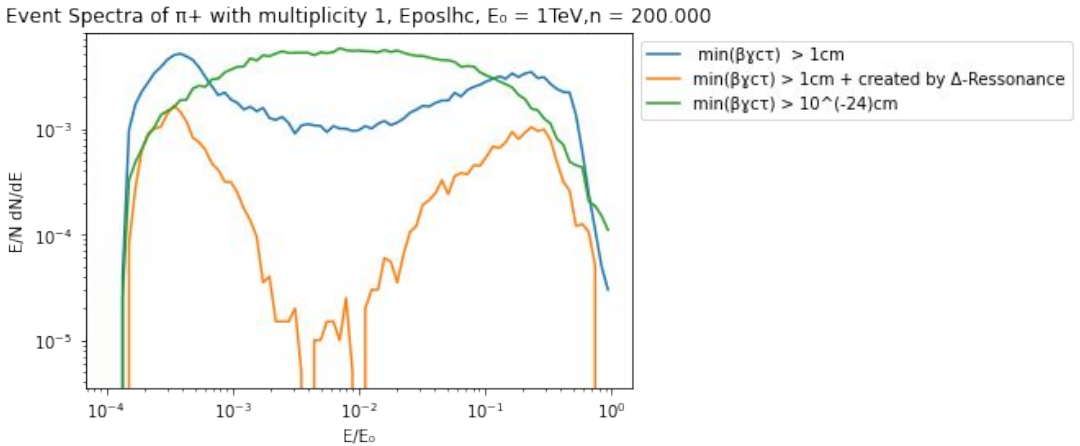

Fig. 5.

The Multiplicity Plot

-Low multiplicity events dominate the high end (last decade) of E/E_0

-Very different results for different models expected here

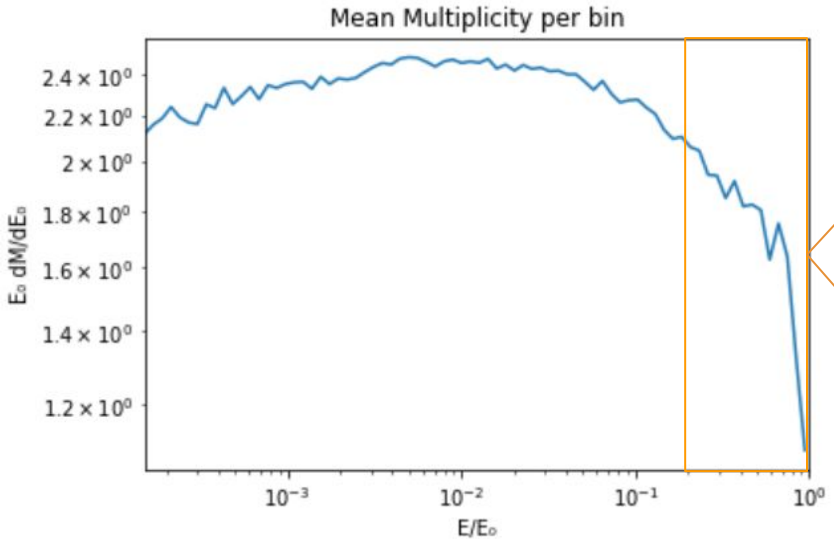

Fig. 6

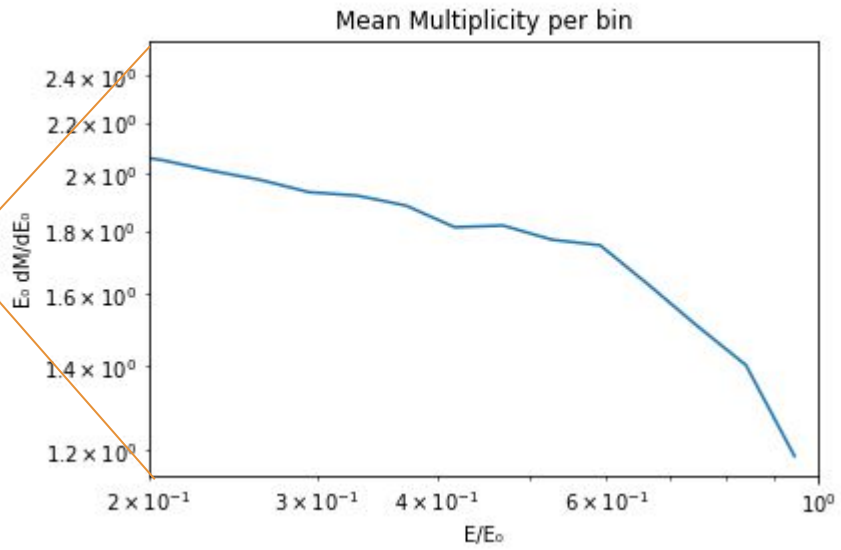

Fig. 7

Probing for pseudorapidity bins

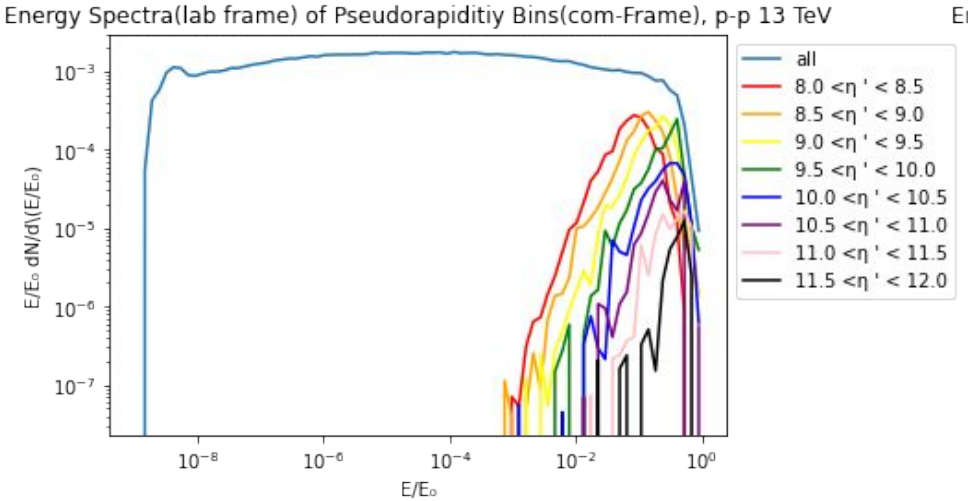

Fig. 8.

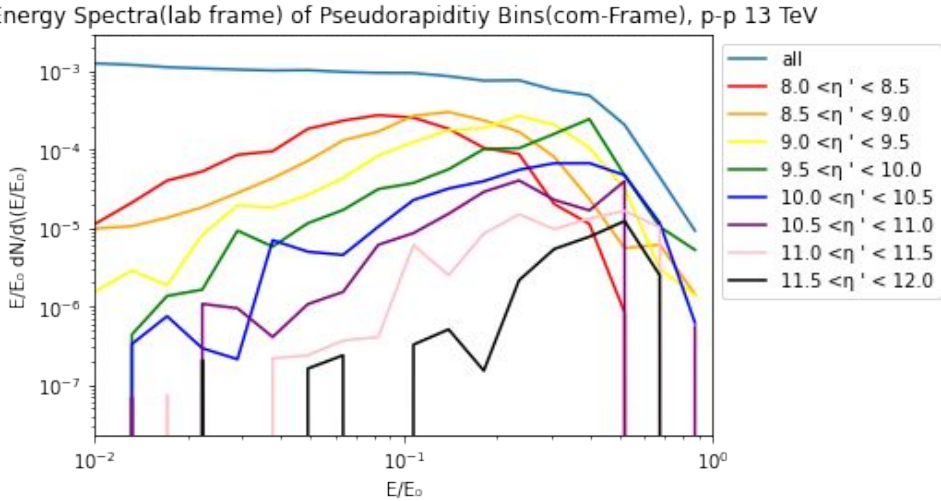

Fig. 9.

Next approach: Choose criteria for the cut-off region

Comparison with LHCf-data

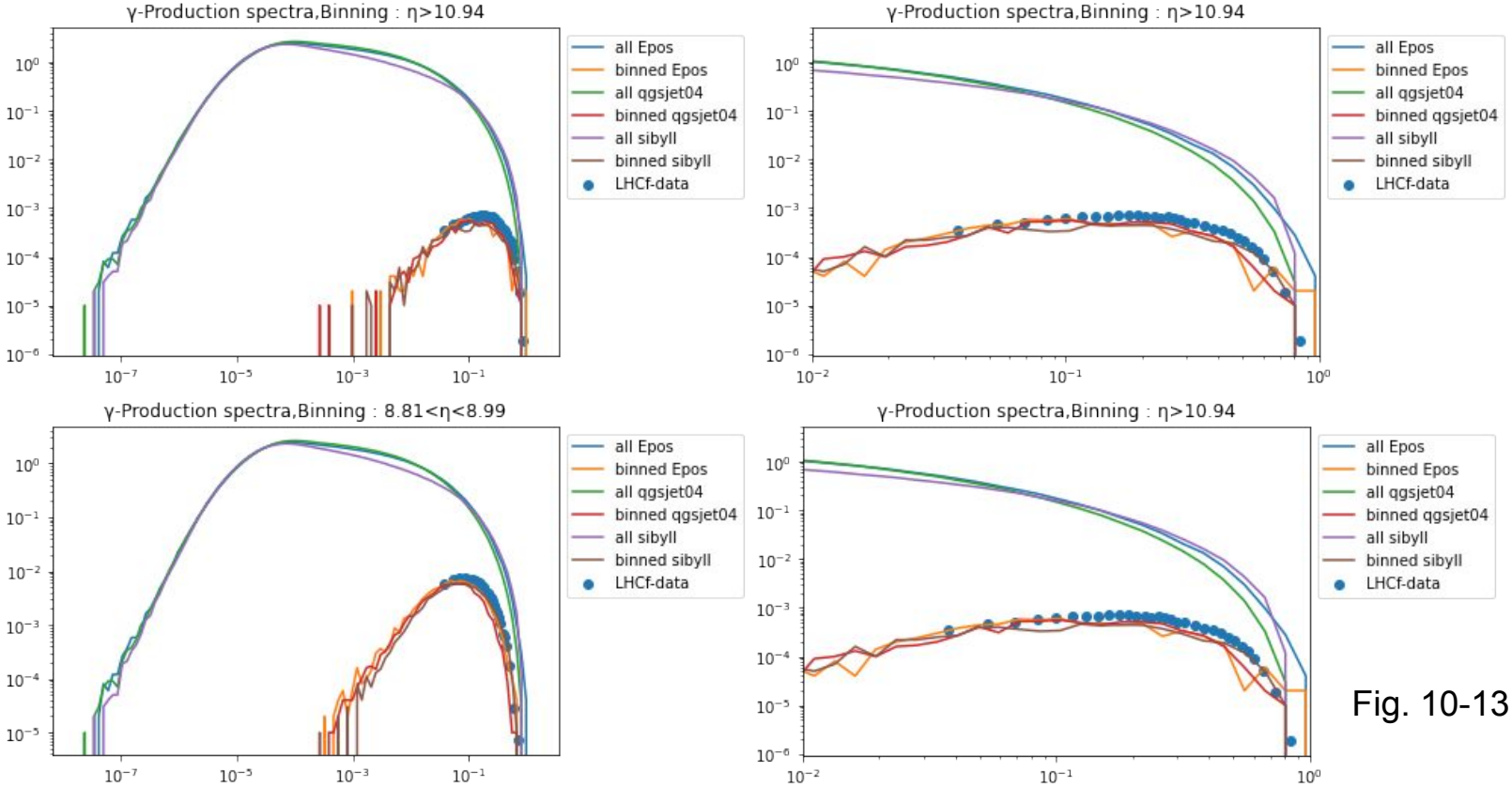

Fig. 10-13