Group Meeting 25-01-2018

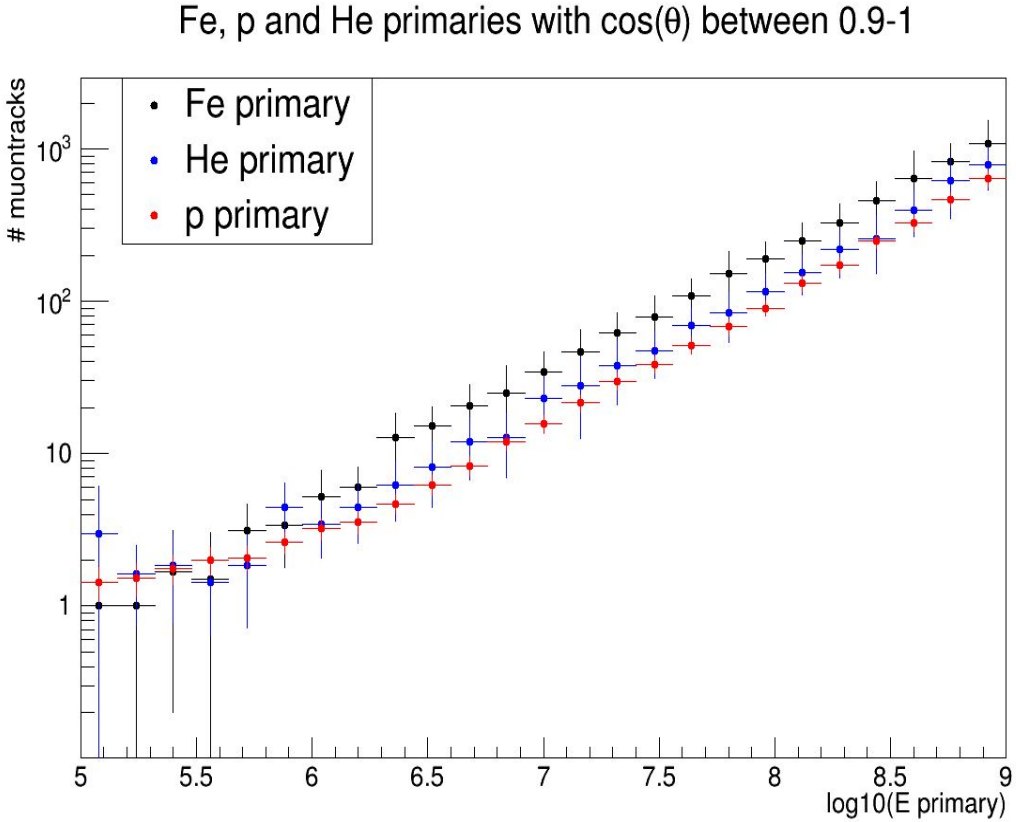
E.L. de Waardt

Recap

- Observed difference between number of muons from different CR primaries for the same energy and zenith angle.

-Observed difference in number of muons for different zenith angles.

-Observed difference between the density of muons in a muonbundle over R, for different energies and different primaries.



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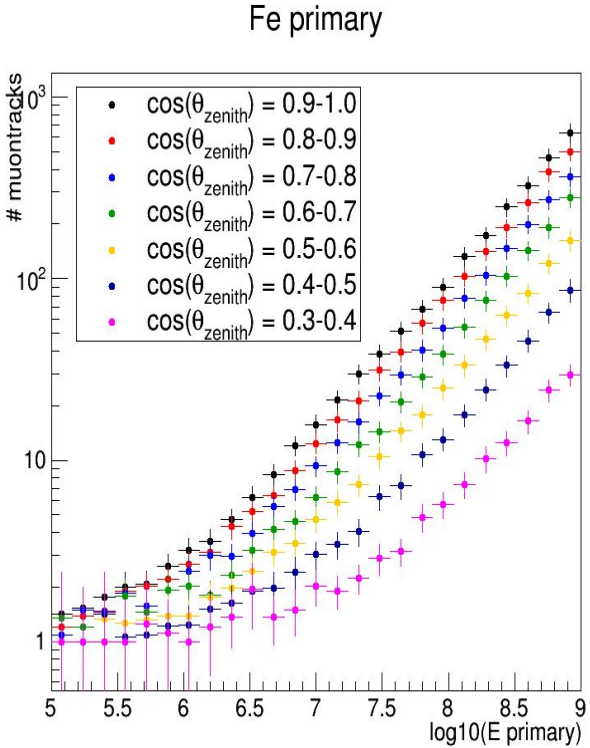

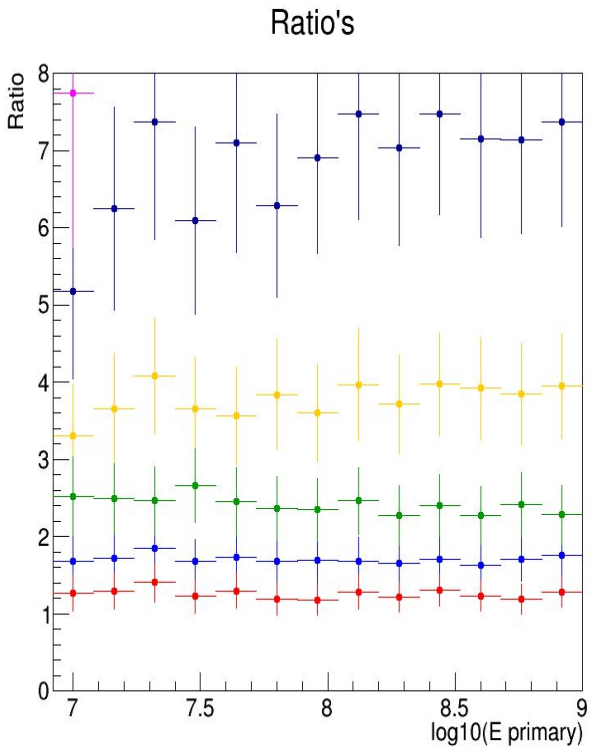

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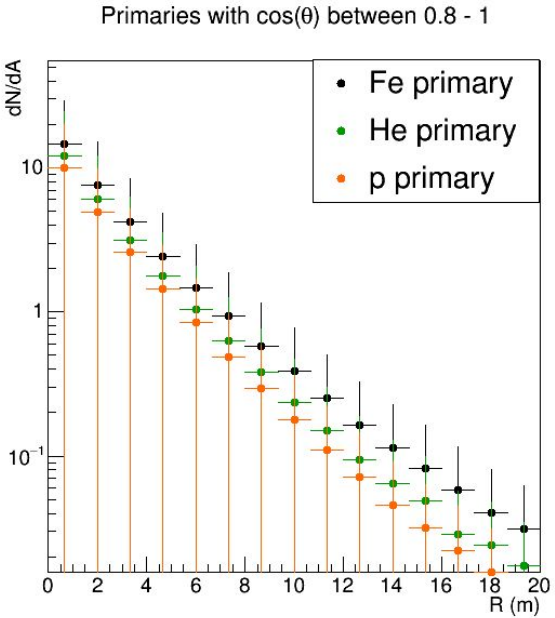
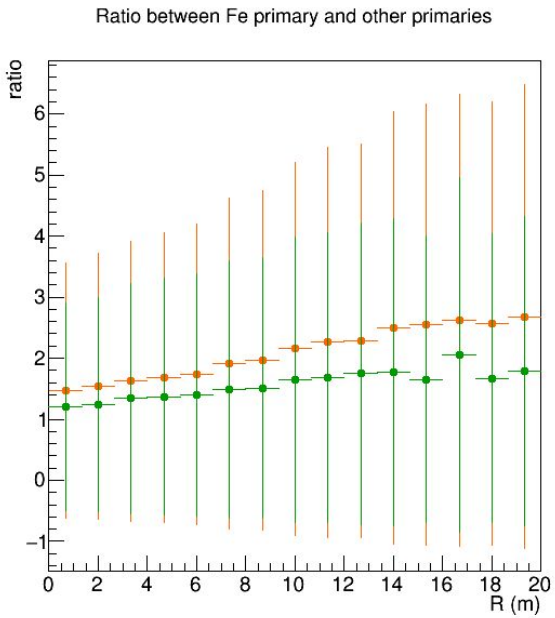
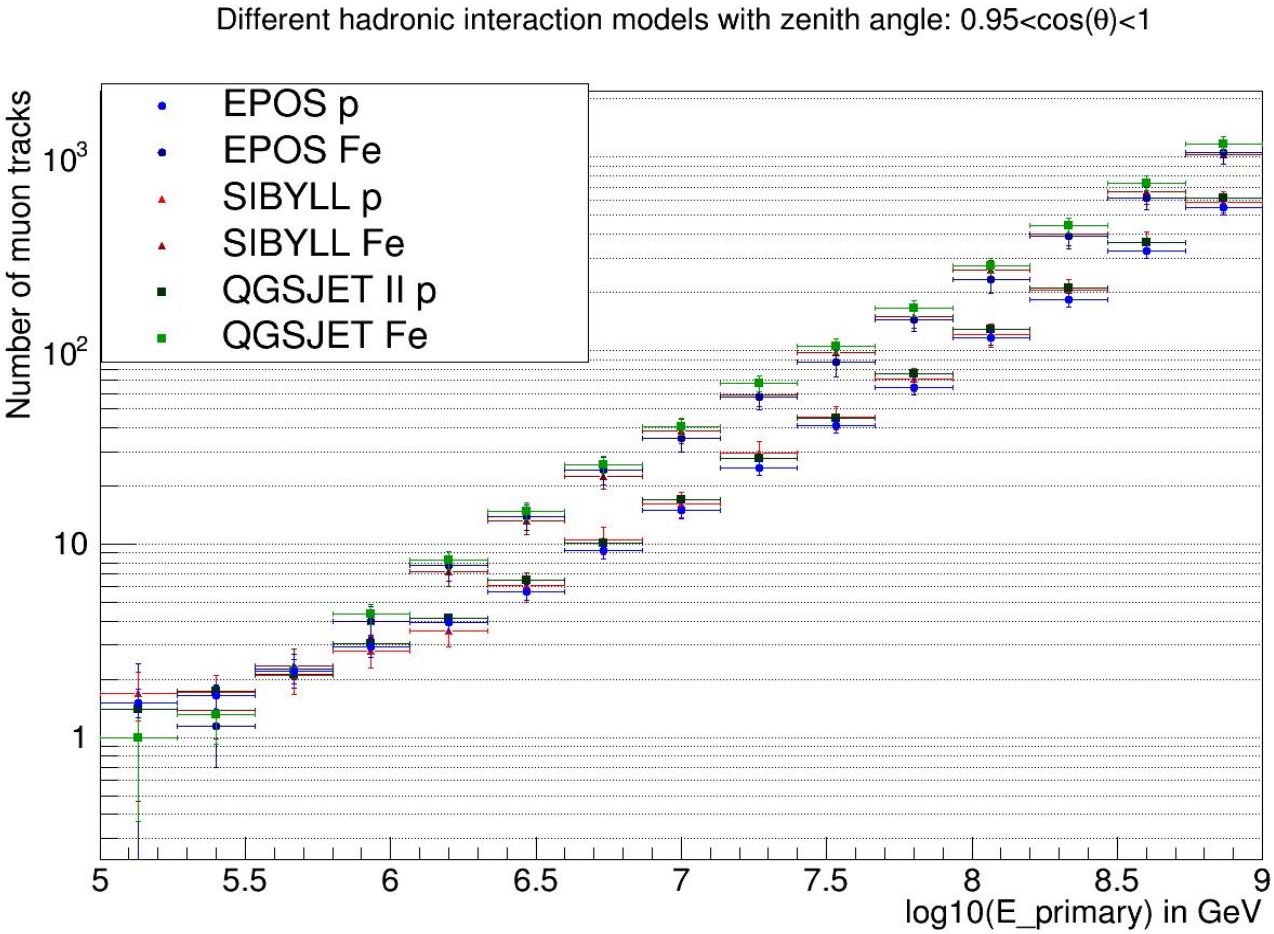
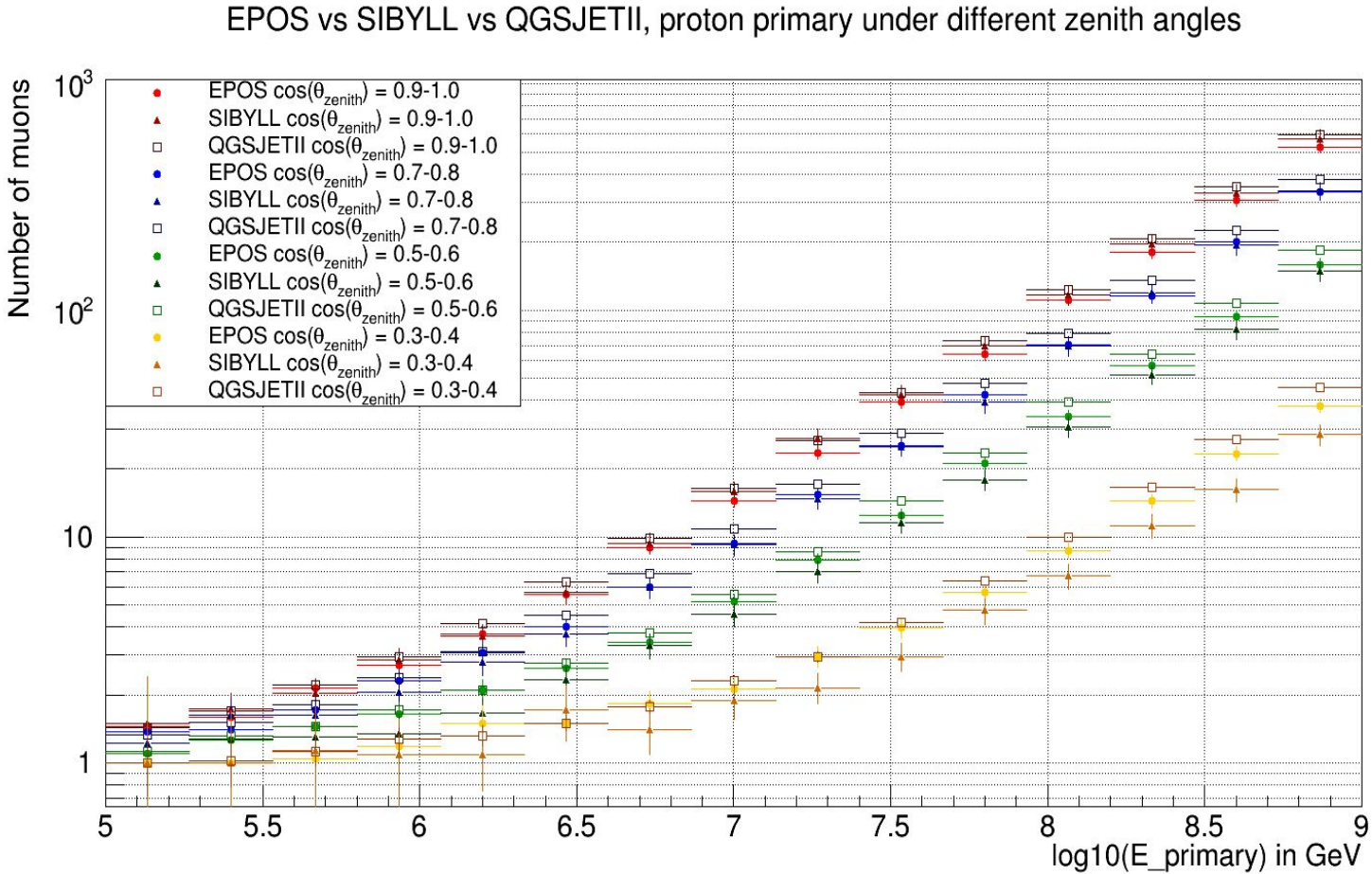


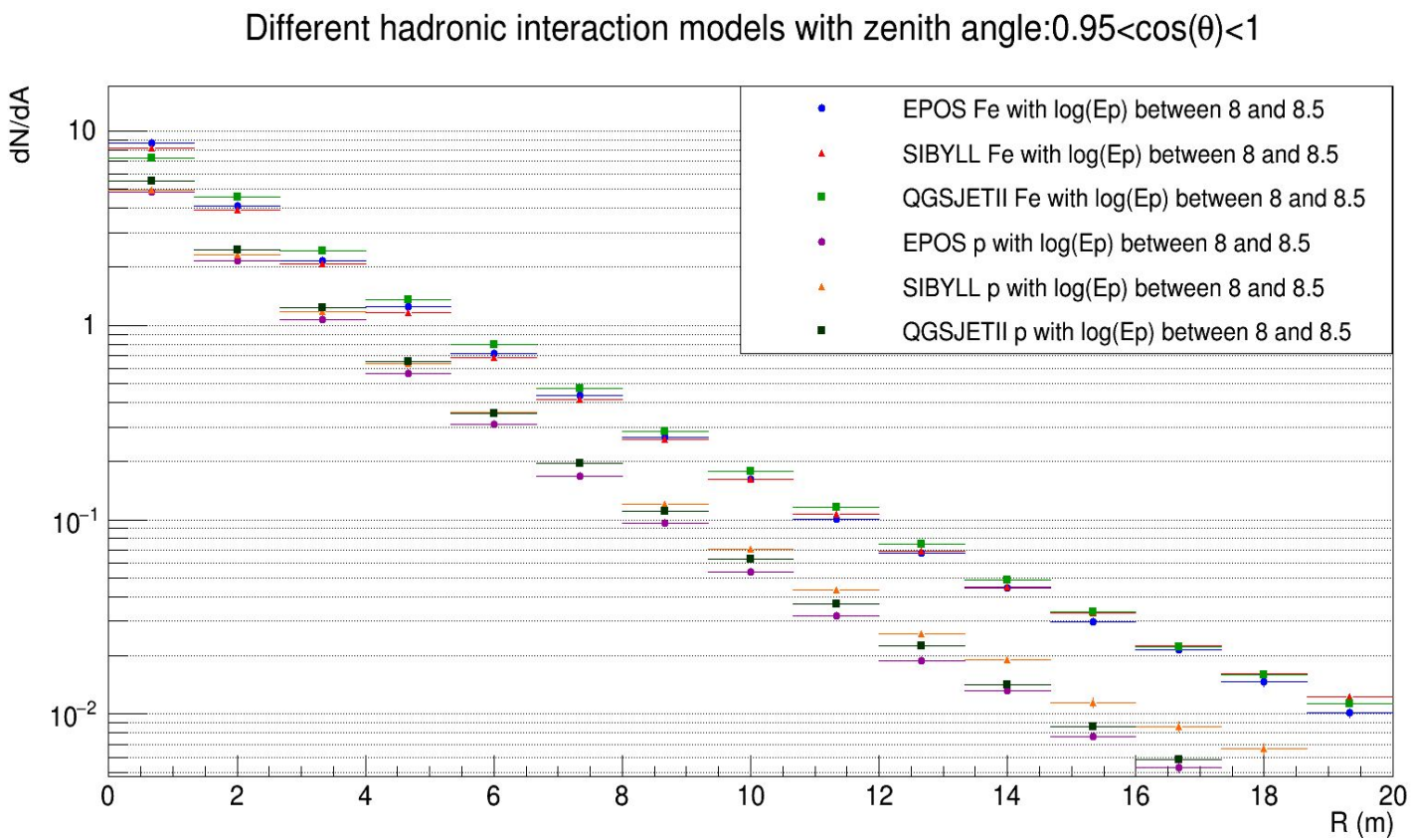


p and Fe for EPOS, SIBYLL and QGSJETII

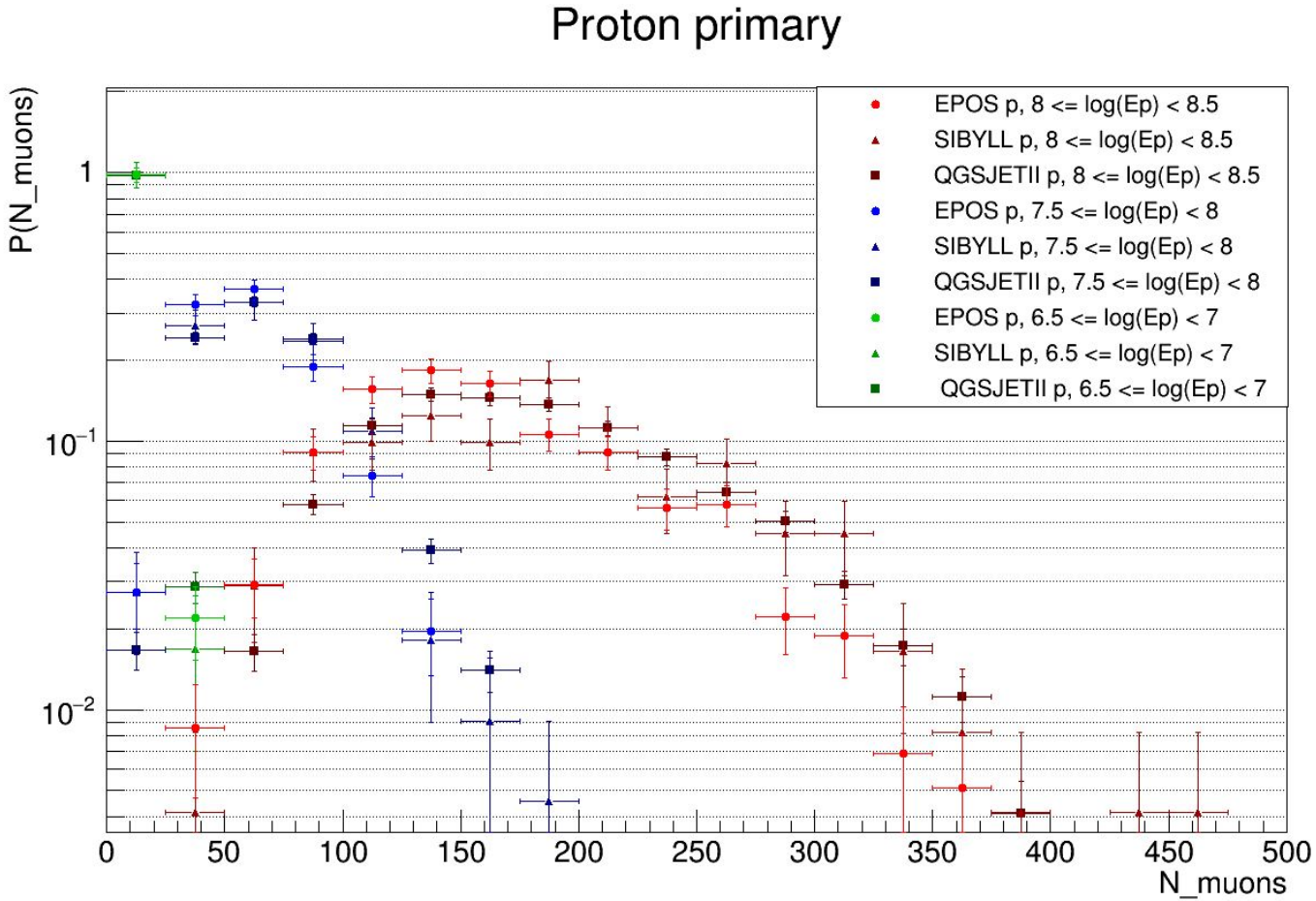


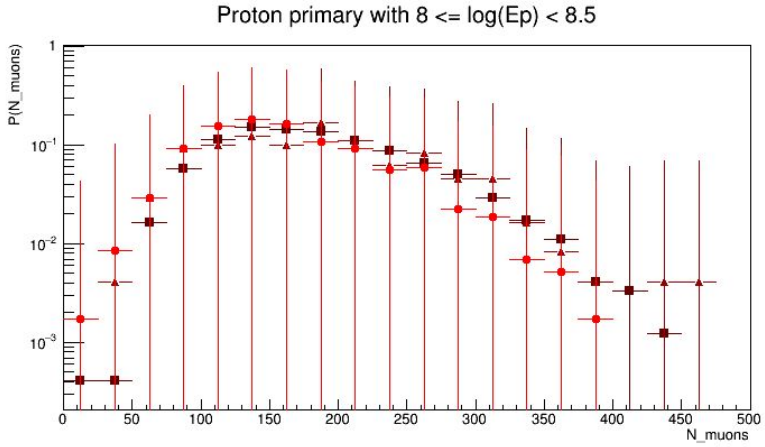
EPOS vs. SIBYLL vs. QGSJET II at the top of can

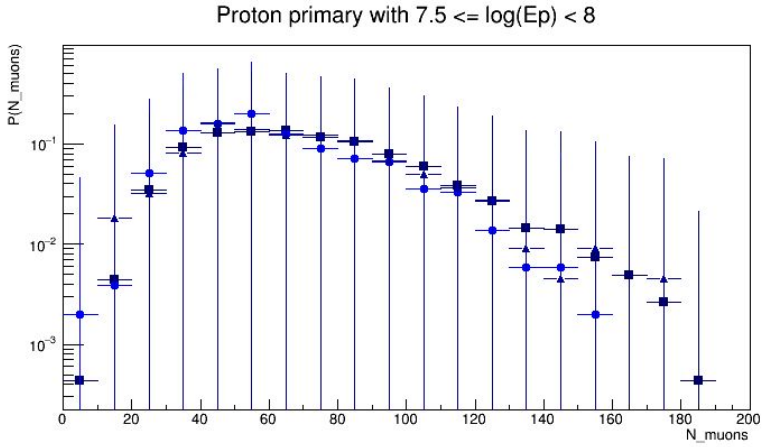


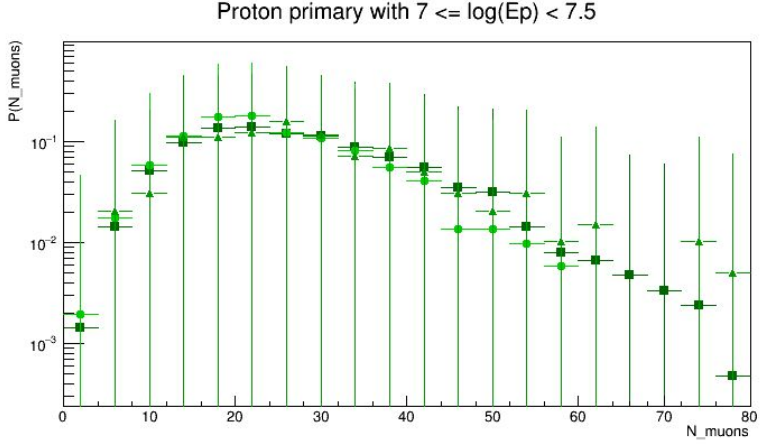

Different hadronic interaction models with zenith angle:0.95<cos(θ)<1
dN/dA
10
1
10^{-1}
10^{-2}
0
2
4
6
8
10
12
14
16
18
20
R (m)
EPOS Fe with log(Ep) between 8 and 8.5
SIBYLL Fe with log(Ep) between 8 and 8.5
QGSJETII Fe with log(Ep) between 8 and 8.5
EPOS p with log(Ep) between 8 and 8.5
SIBYLL p with log(Ep) between 8 and 8.5
QGSJETII p with log(Ep) between 8 and 8.5

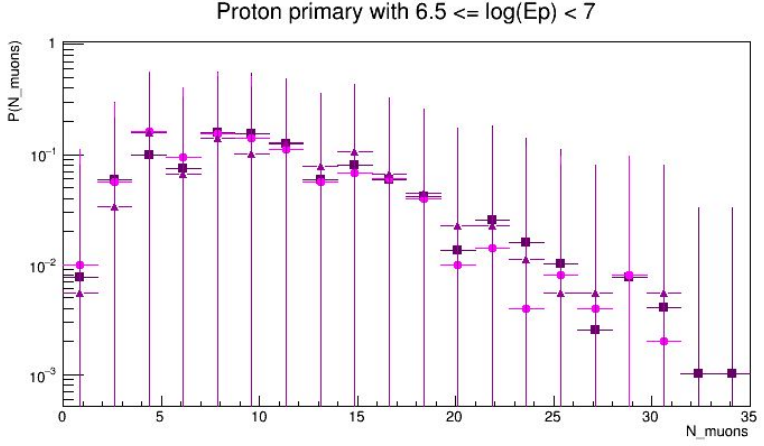
Multiplicity distribution at top of can

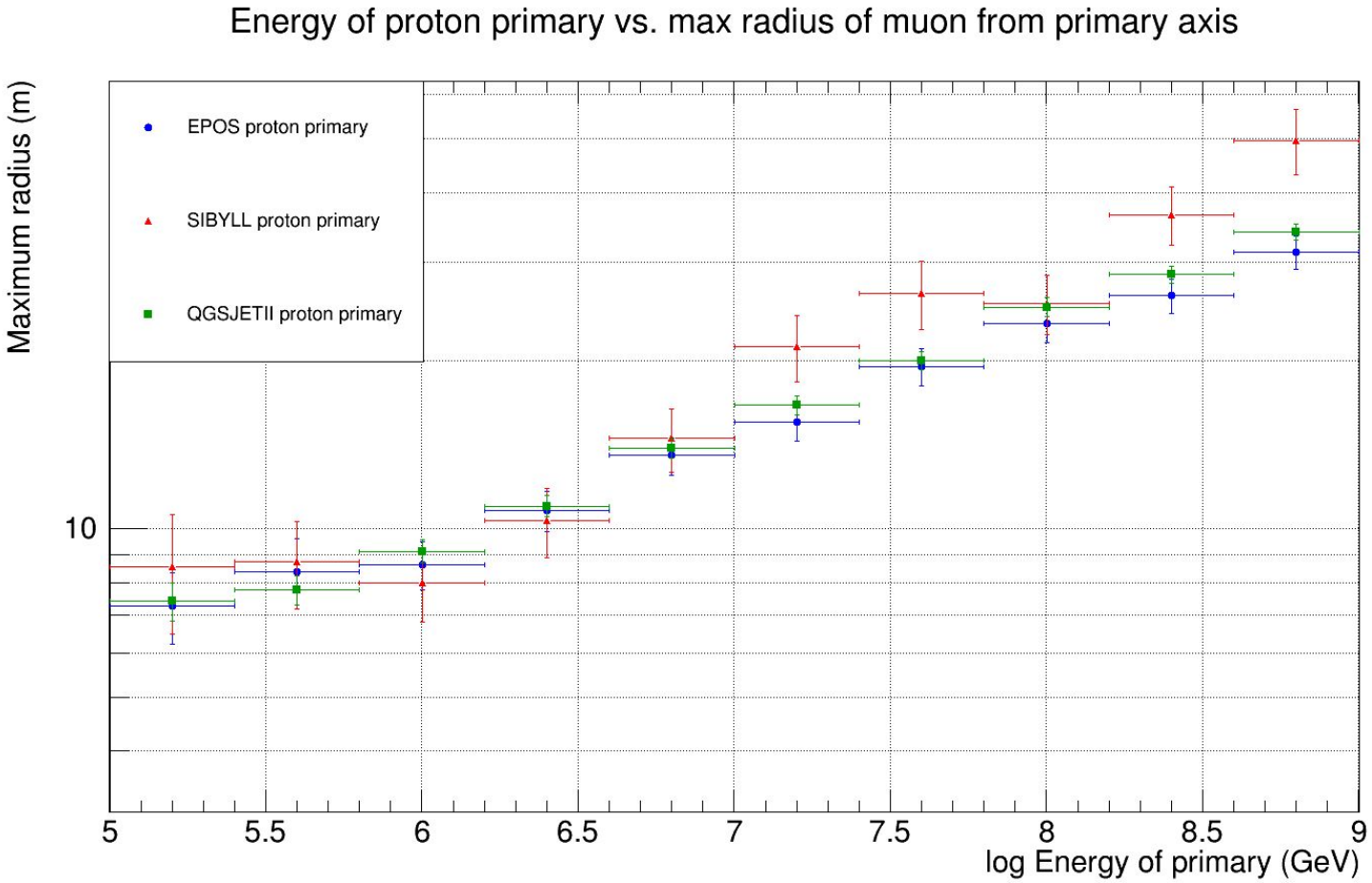


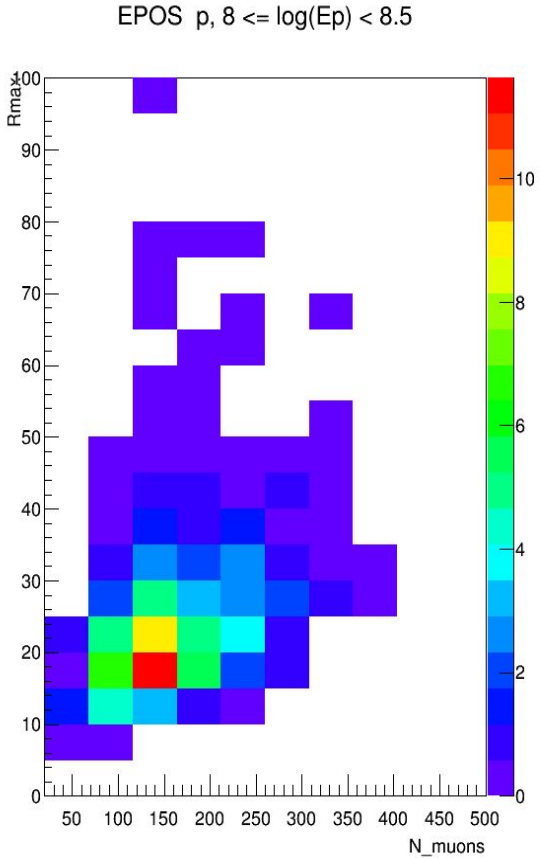

Proton primary with 8 <= log(Ep) < 8.5
P(N_muons)
N_muons

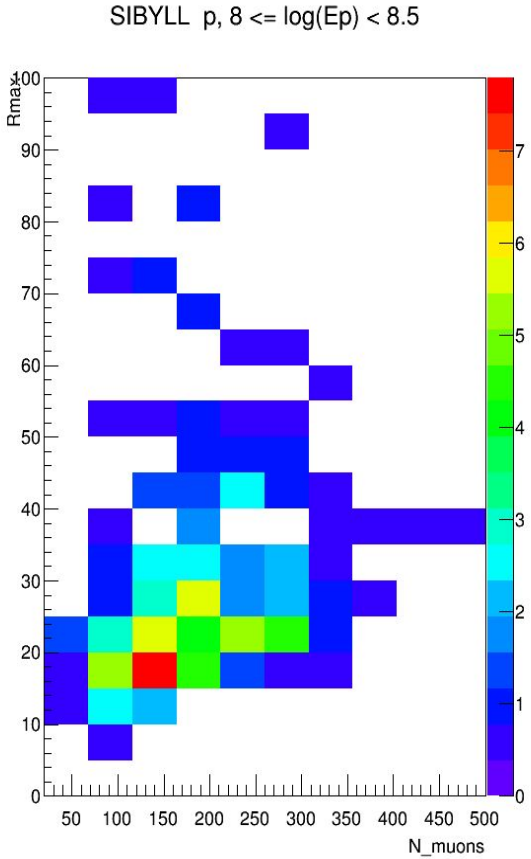

Proton primary with 7.5 <= log(Ep) < 8
P(N_muons)
N_muons

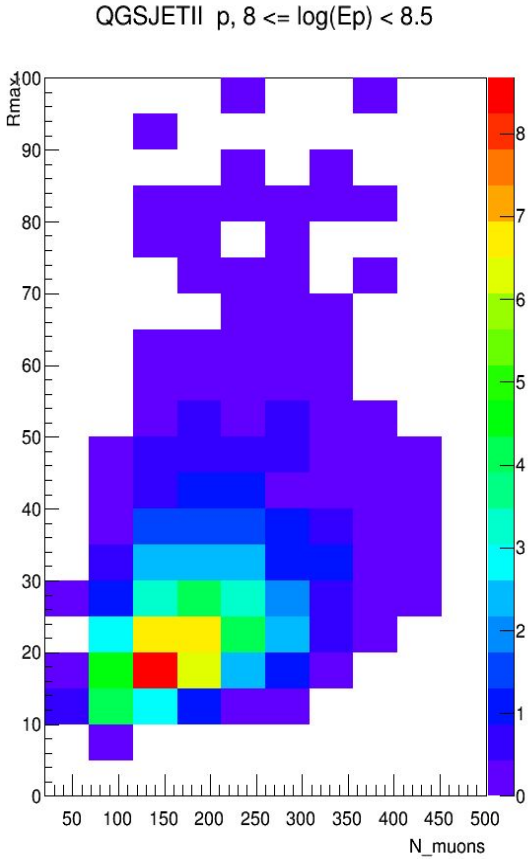

Proton primary with 7 <= log(Ep) < 7.5
P(N_muons)
N_muons


Proton primary with 6.5 <= log(Ep) < 7
P(N_muons)
N_muons

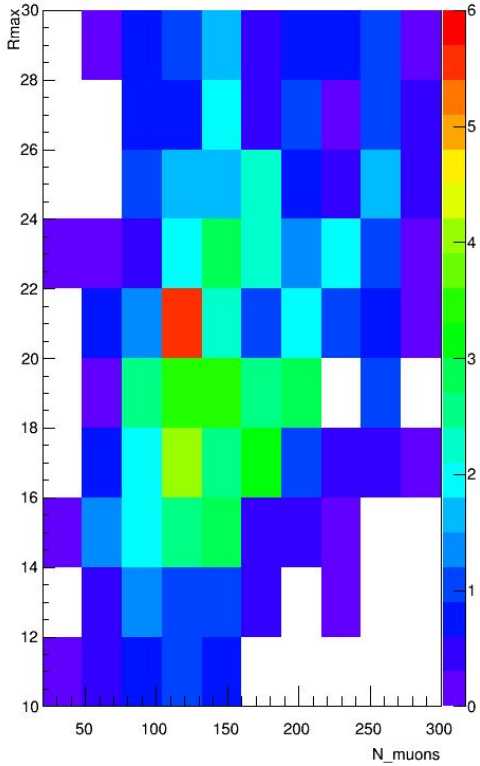

Energy of proton primary vs. max radius of muon from primary axis
EPOS proton primary
SIBYLL proton primary
QGSJETII proton primary
Maximum radius (m)
10
5
5.5
6
6.5
7
7.5
8
8.5
9
log Energy of primary (GeV)


EPOS p, 8 <= log(Ep) < 8.5
Rmax
N_muons


SIBYLL p, 8 <= log(Ep) < 8.5
Rmax
N_muons


QGSJETII p, 8 <= log(Ep) < 8.5
Rmax
N_muons

EPOS p, 8 <= log(Ep) < 8.5



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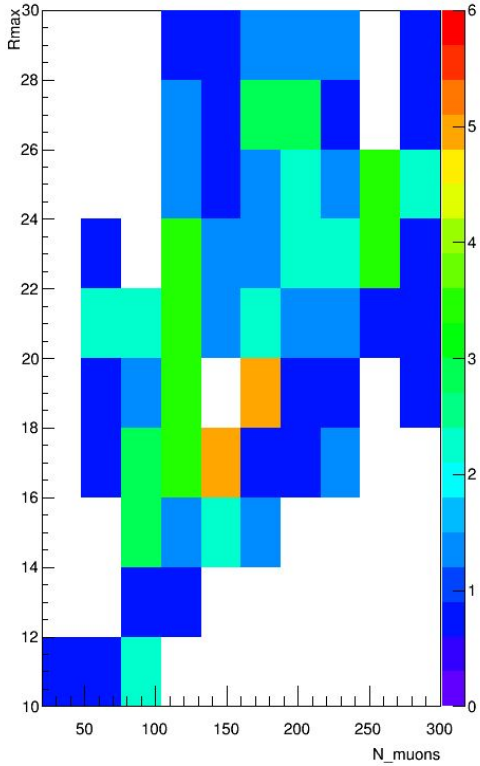

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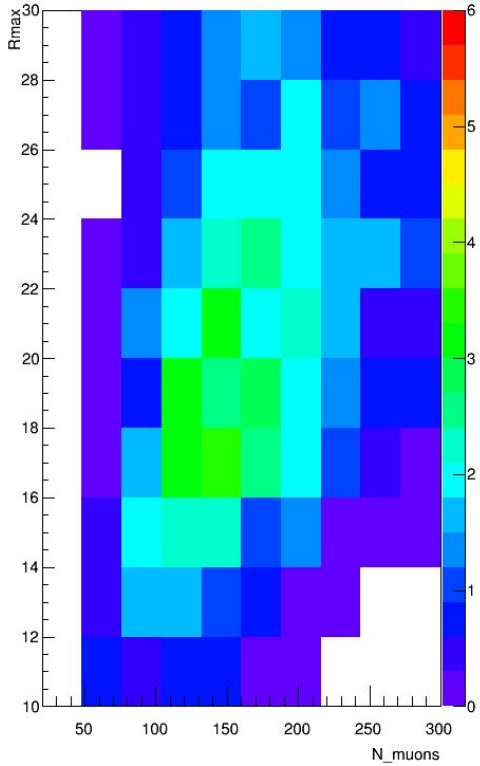
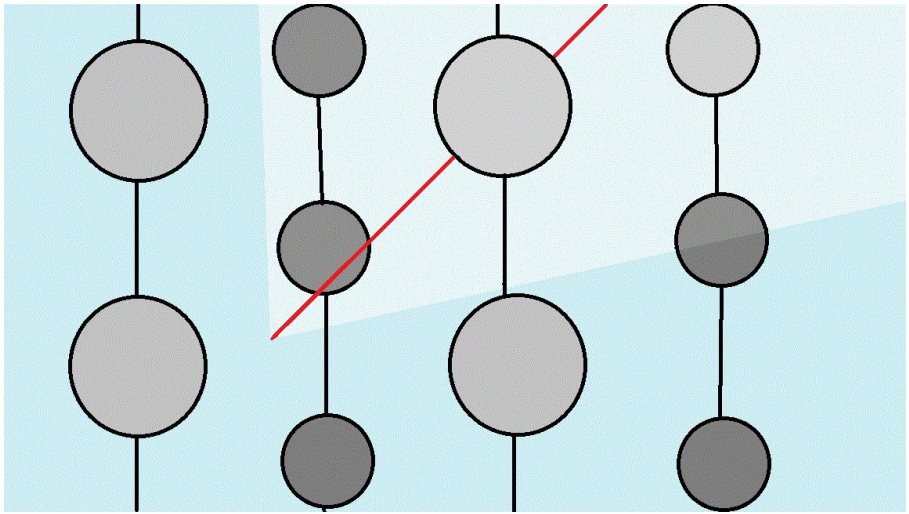
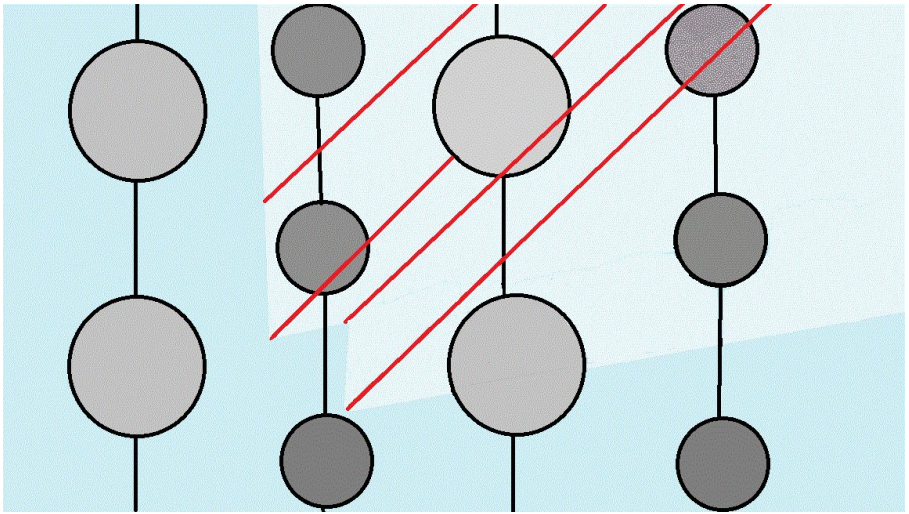
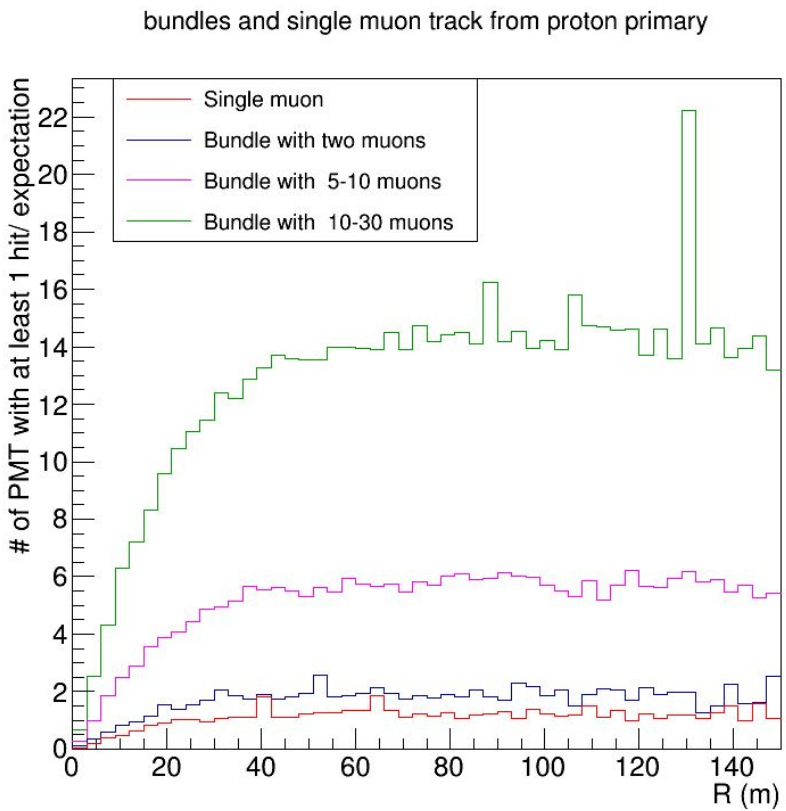


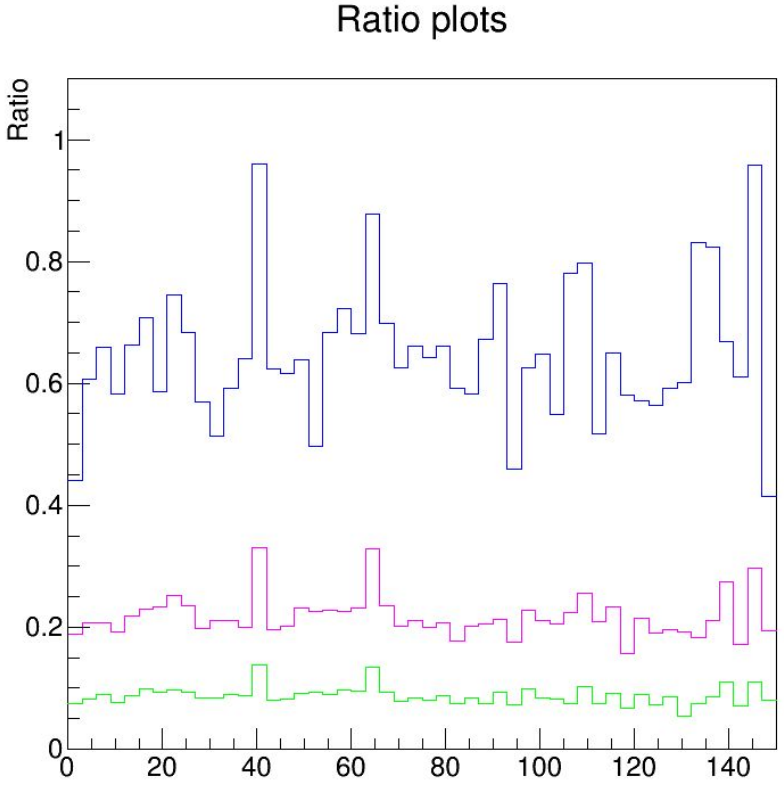
Explanation procedure





Detector level





Investigation for scintillators at sea

- Cooperate with HISPARC
- Working on QGSJET II 04
- Trying to get information of the total energy of the shower