Introduction

- RVP is a particle ID used to identify electron neutrino events. It is based on the various reconstruction variables.
- The technique details are described in NOvA DocDB 8381.

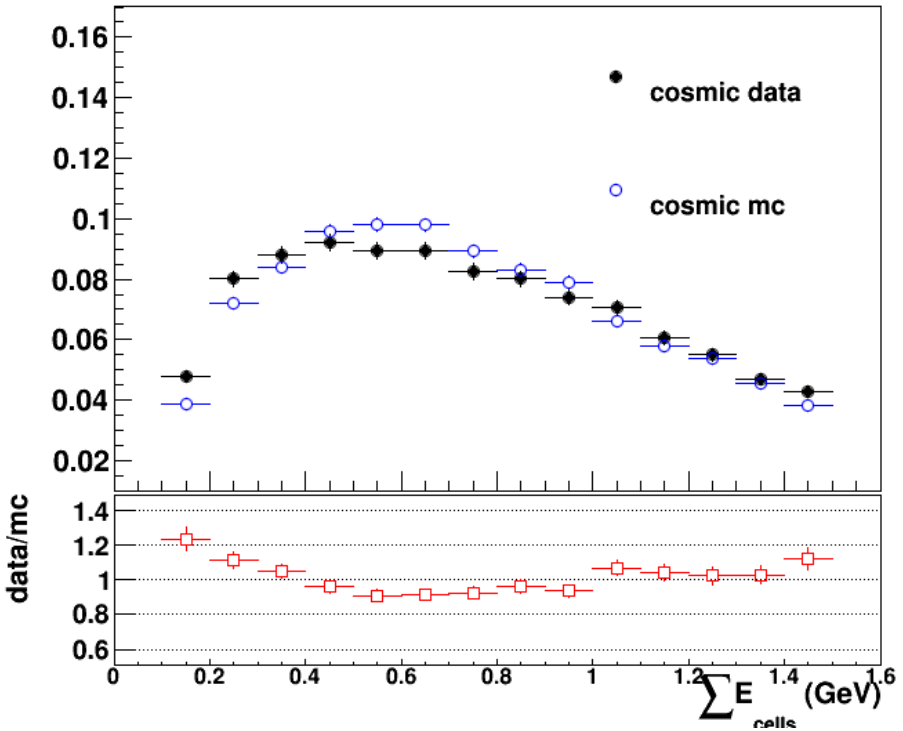
Data and MC samples

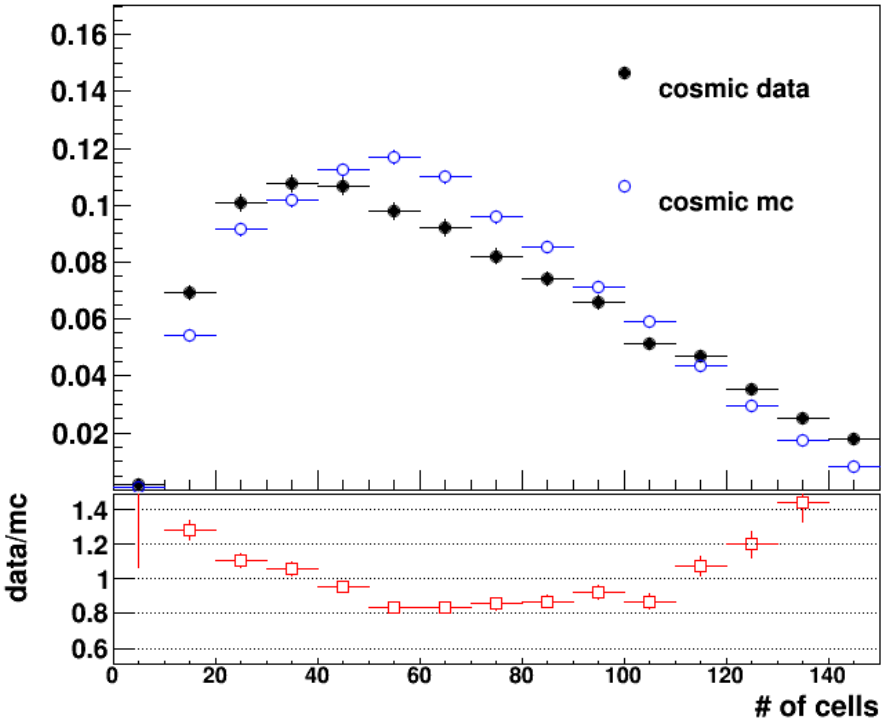
- Data
  - /nova/prod/data/FarDet/S13-10-11/cosmic/reco/000116/11654/*data.reco.root
- MC
  - /nova/prod/mc/S13-10-11/cosmics/fd/StaggerOct10ReadoutSim_ChanMask11342/fd_r01*reco.root
- We directly use Kalman track to replace discrete track, there is no retraining.

Event Selection Criteria

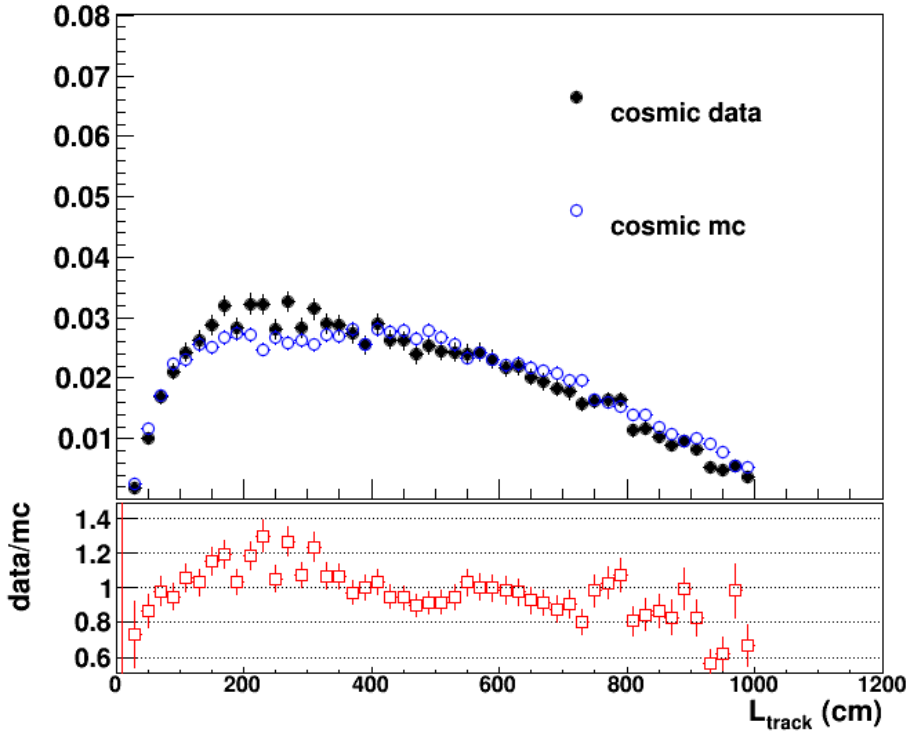
- Vy>0cm, 150cm < Vz < 650cm
- 0.1GeV < $\sum E_{cells}$ < 1.5GeV
- There is at least one 3D Kalman track
- 0 < cosϴ < 0.7 for longest track

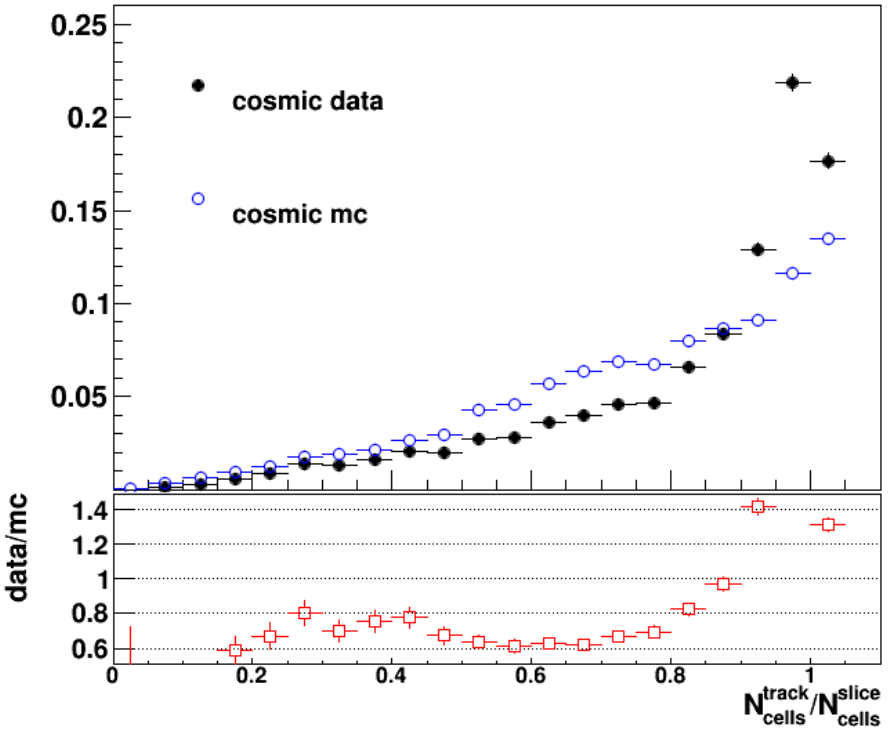
RVP inputs: from slice



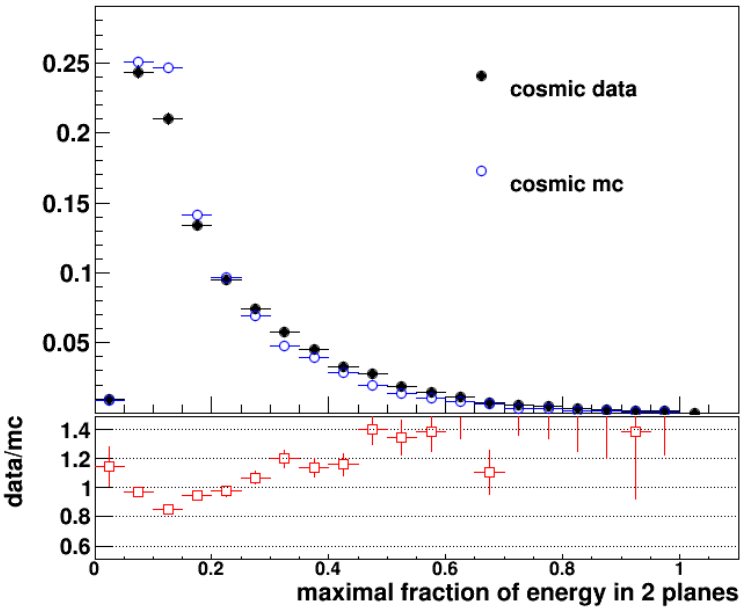


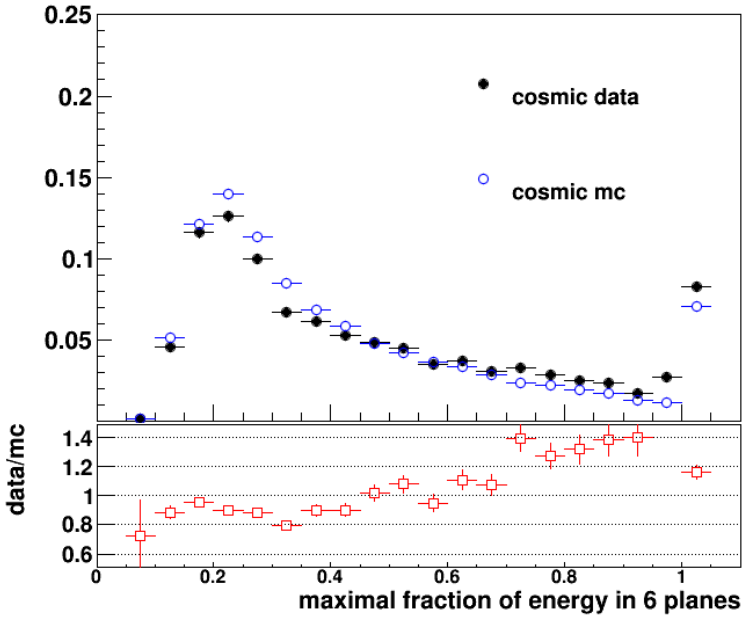
RVP inputs: from longest Kalman track

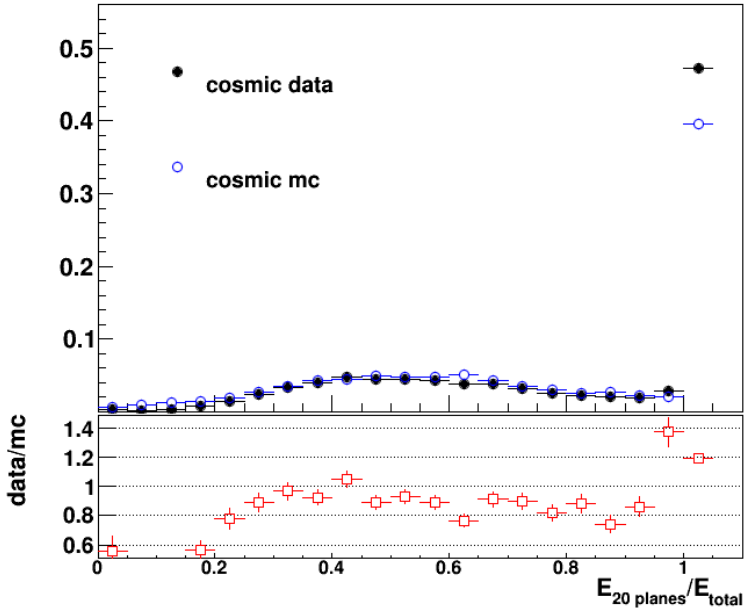




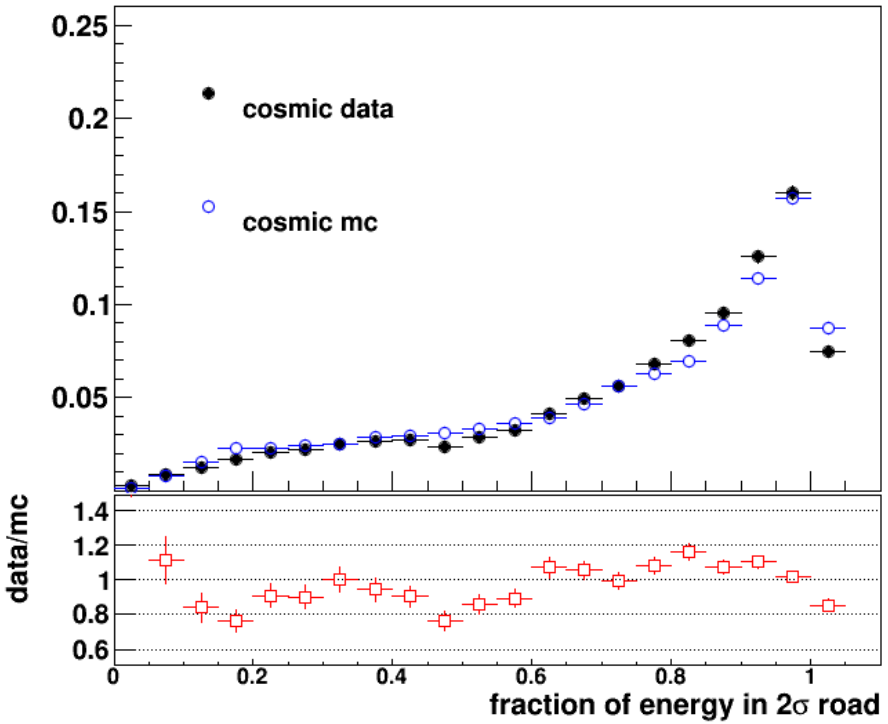
RVP inputs: longitudinal shower

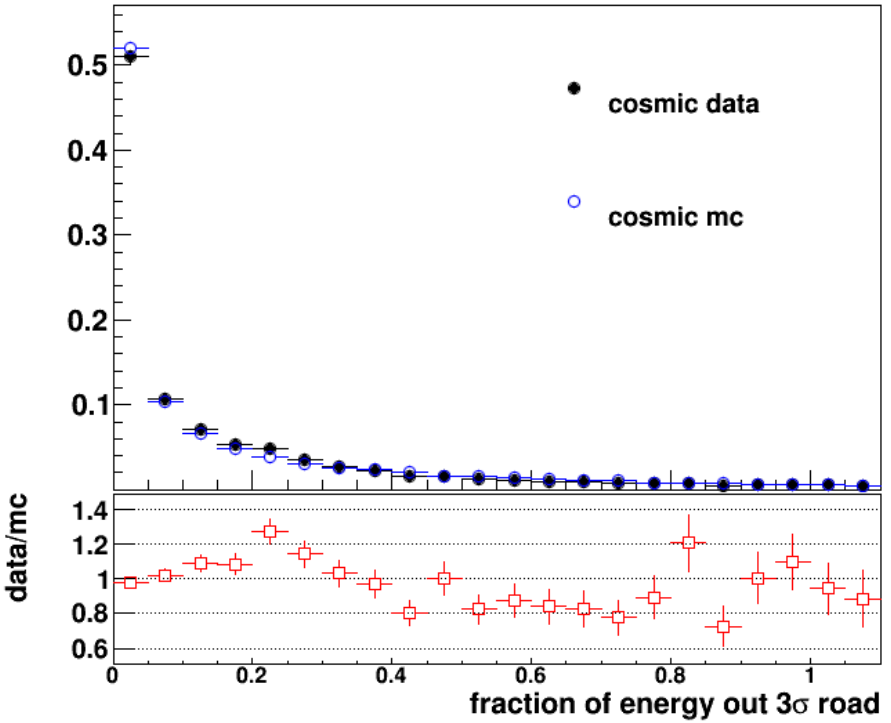




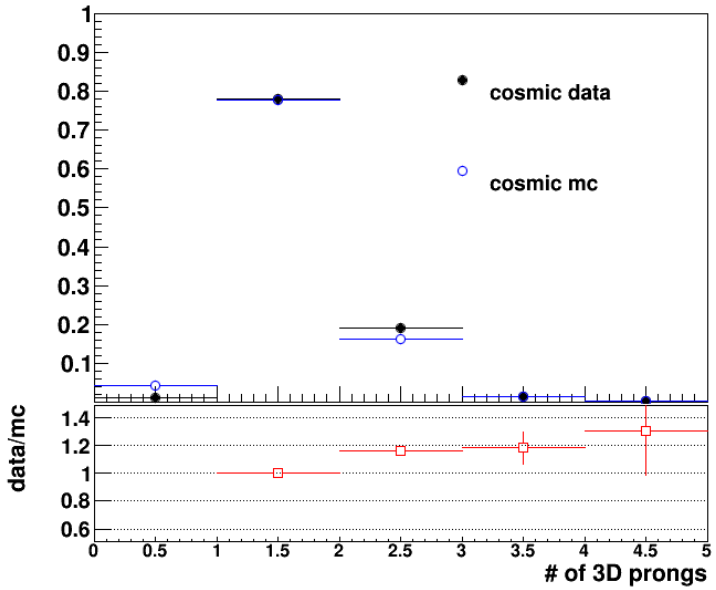


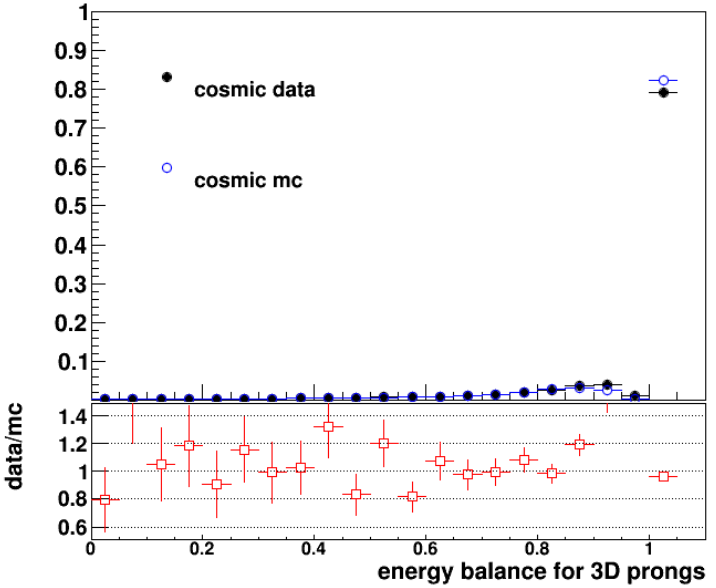
RVP inputs: transverse shower

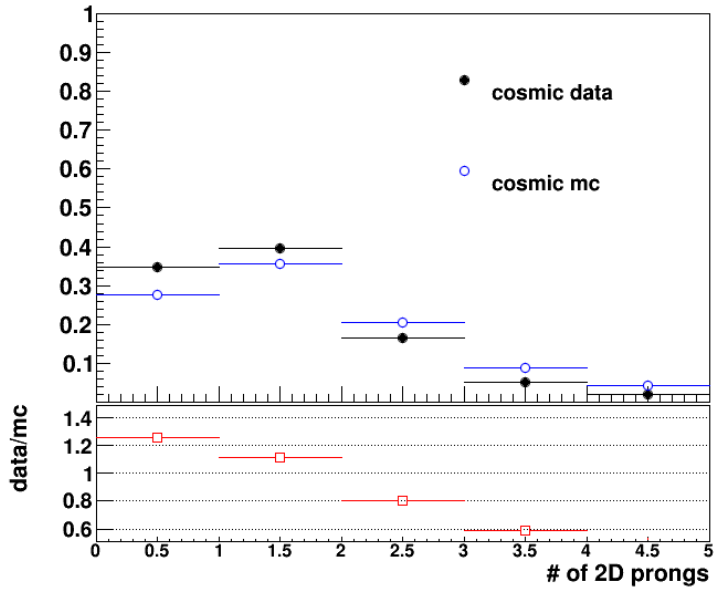


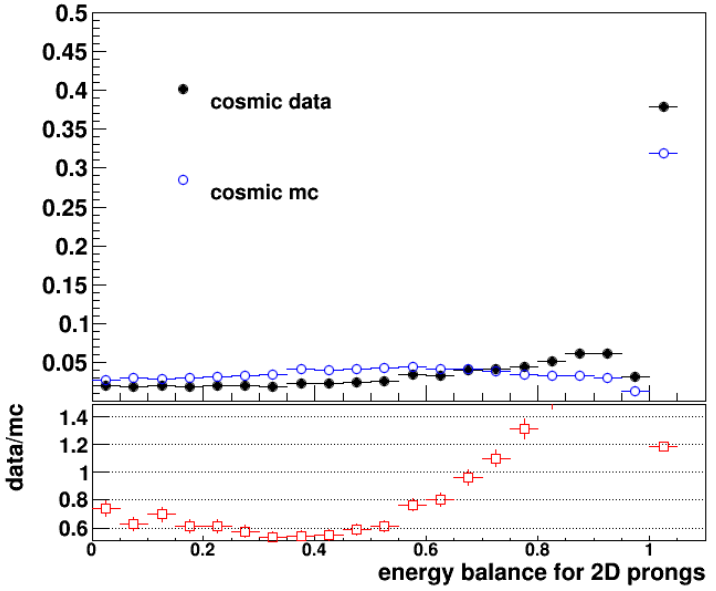


RVP inputs: from Prongs

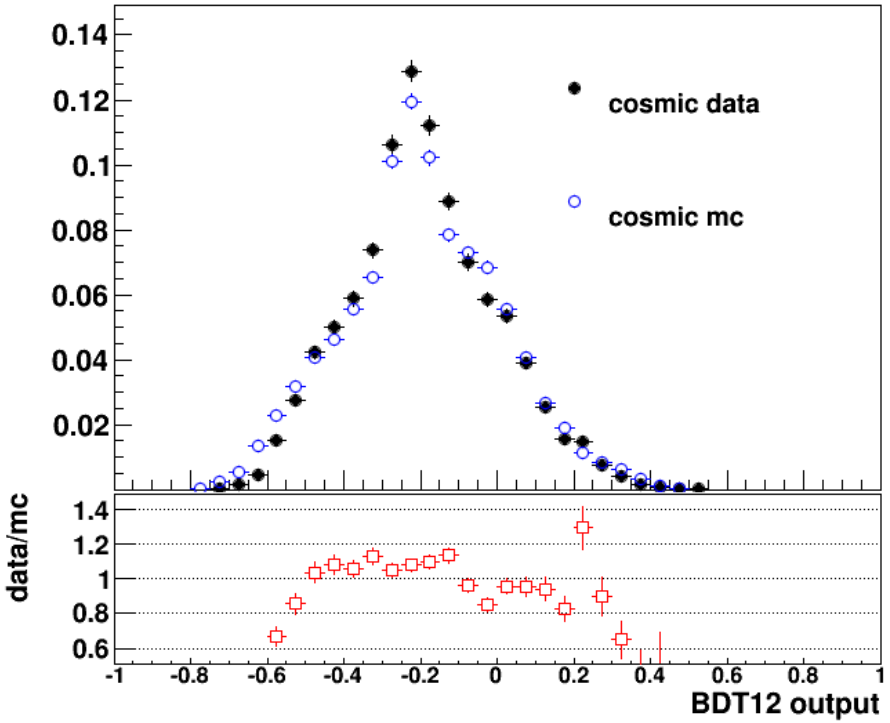


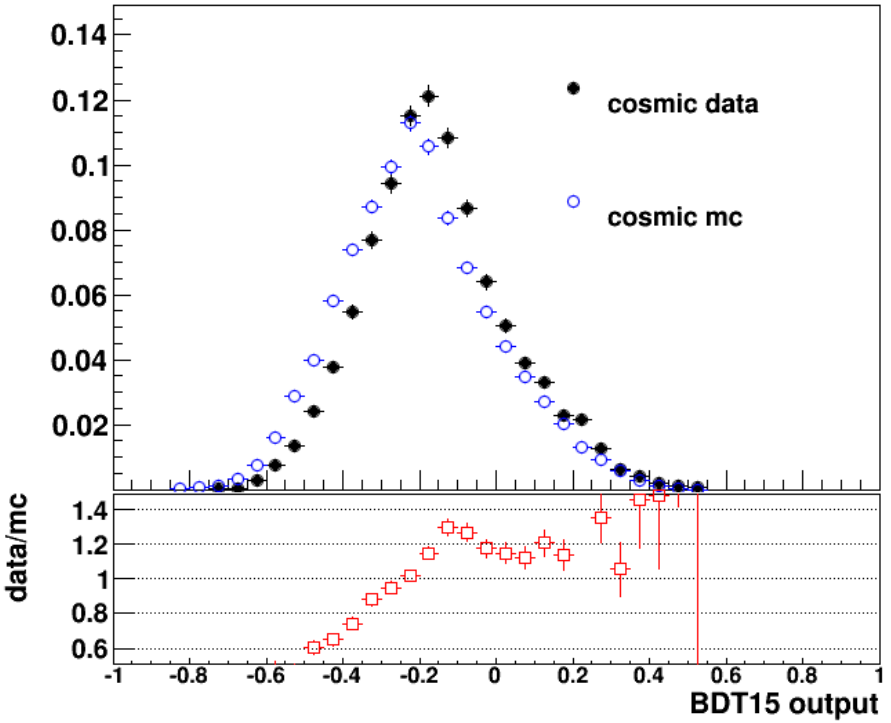




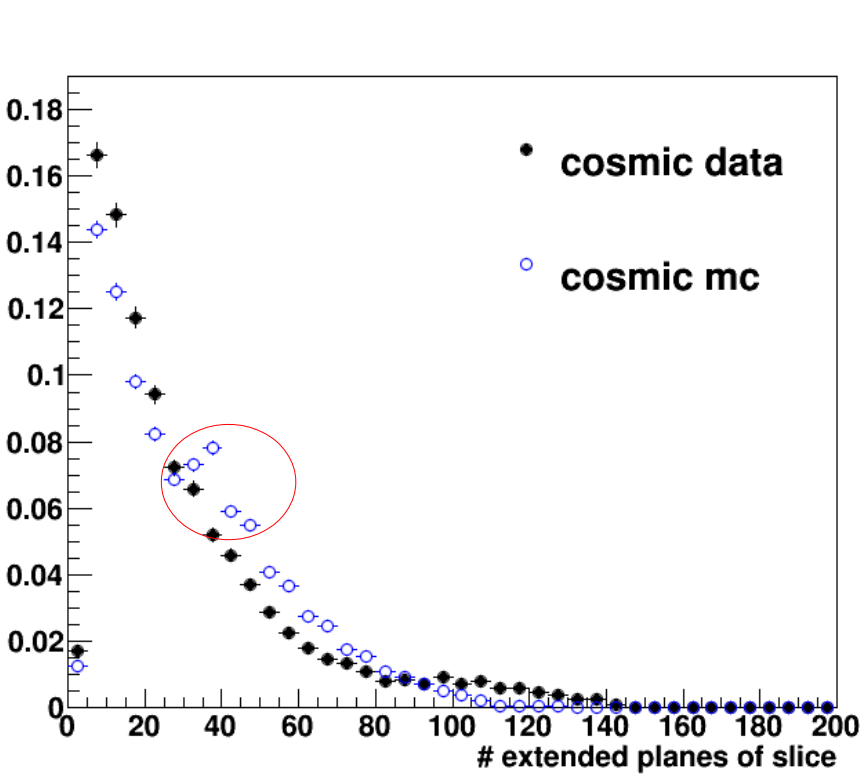


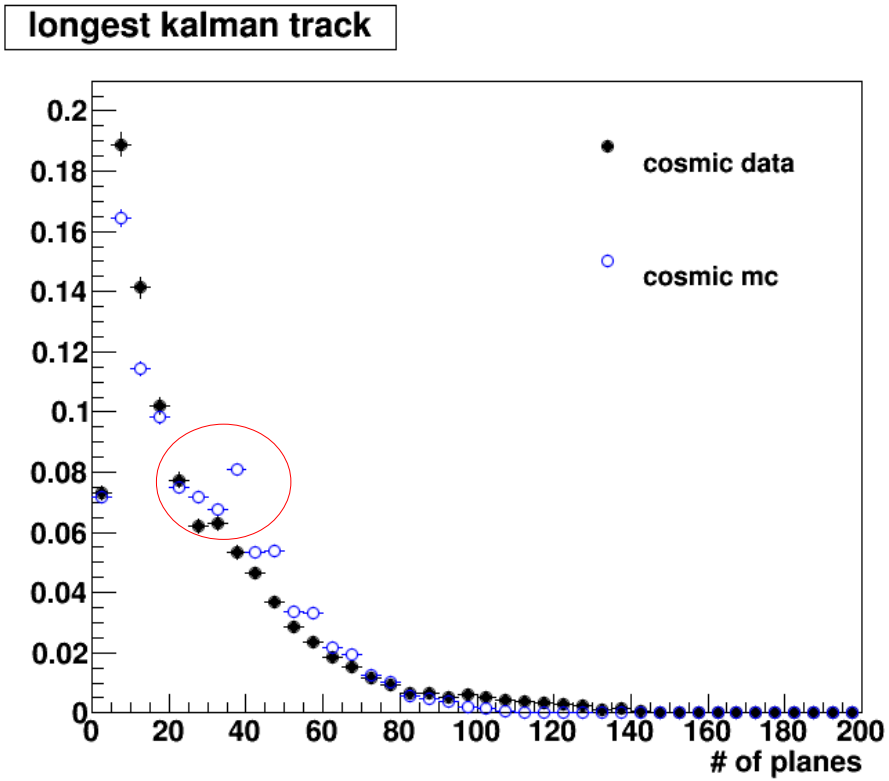
RVP outputs


cosmic data
cosmic mc
data/mc
BDT12 output

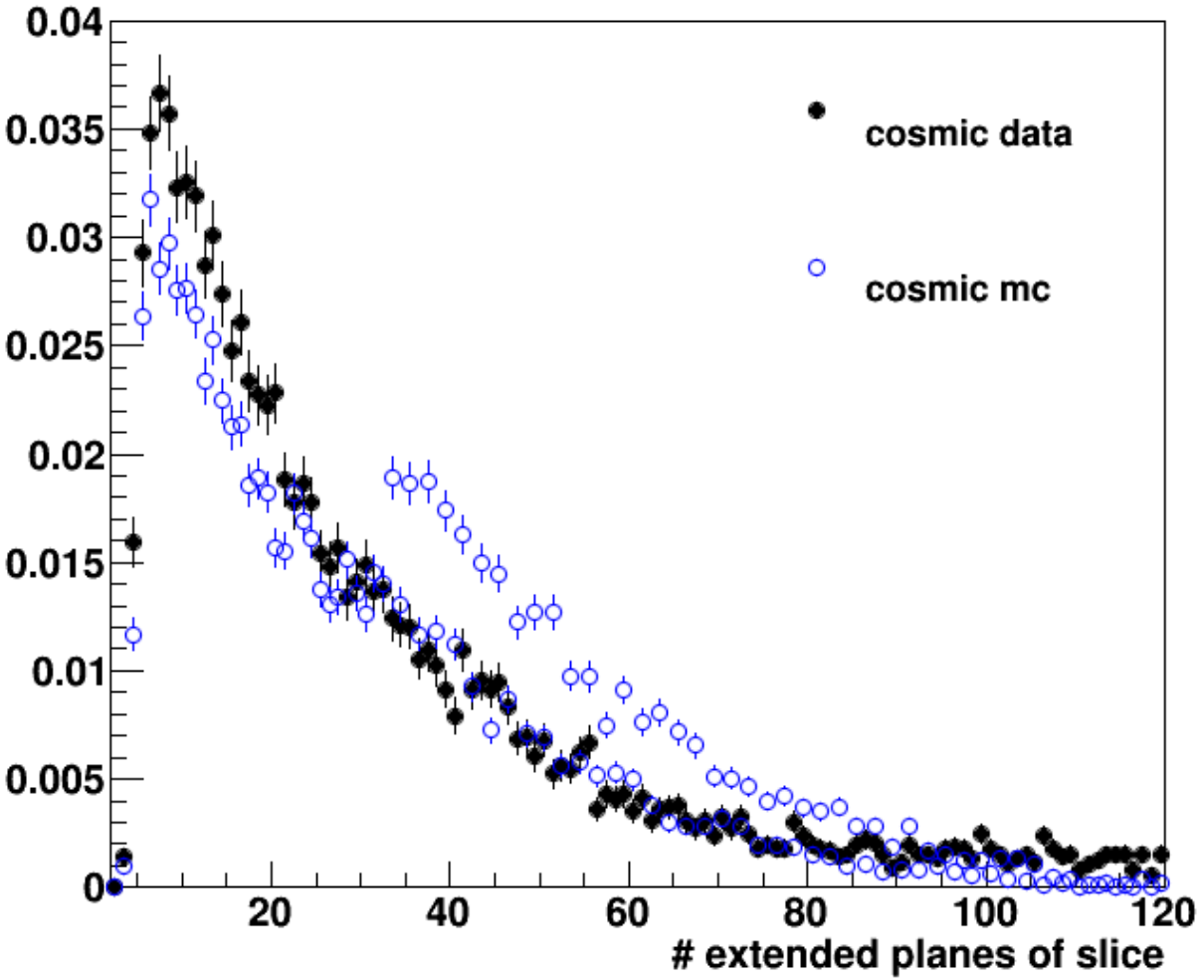

cosmic data
cosmic mc
data/mc
BDT15 output

of extent planes





of extent planes

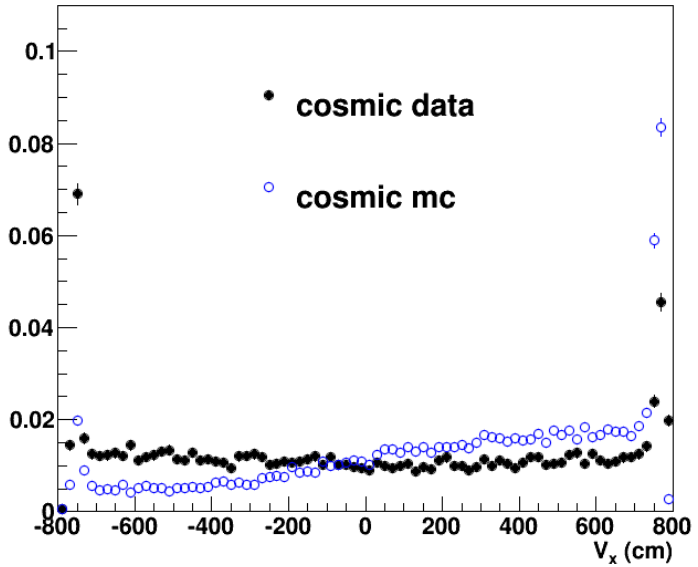


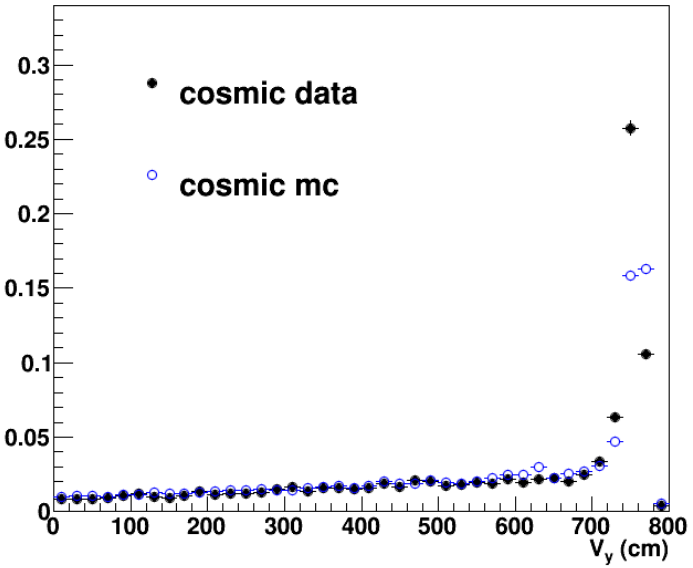
Summary

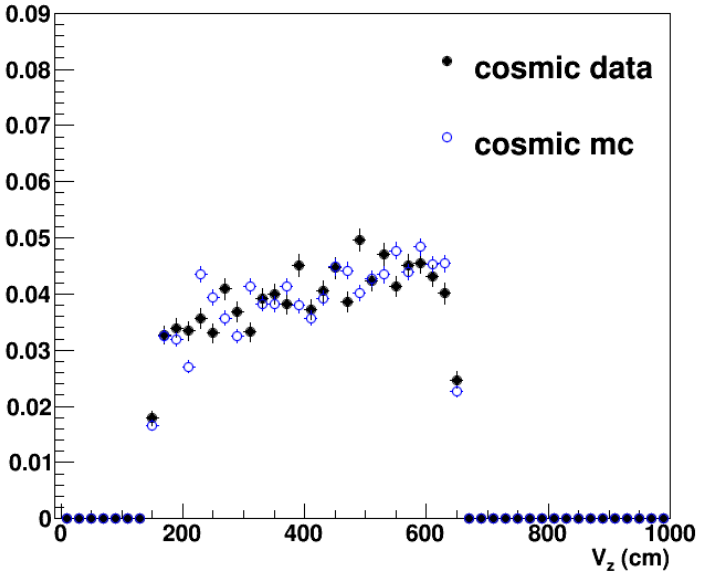
- First look at data/mc comparison, both inputs and outputs look reasonably well. We will try to understand the residual discrepancies, and analyze more data and MC. In particular, we will take a close look at the events with high RVP output.
- We will retrain the RVP using longest Kalman track and updated calibration constants in near future.

back-up

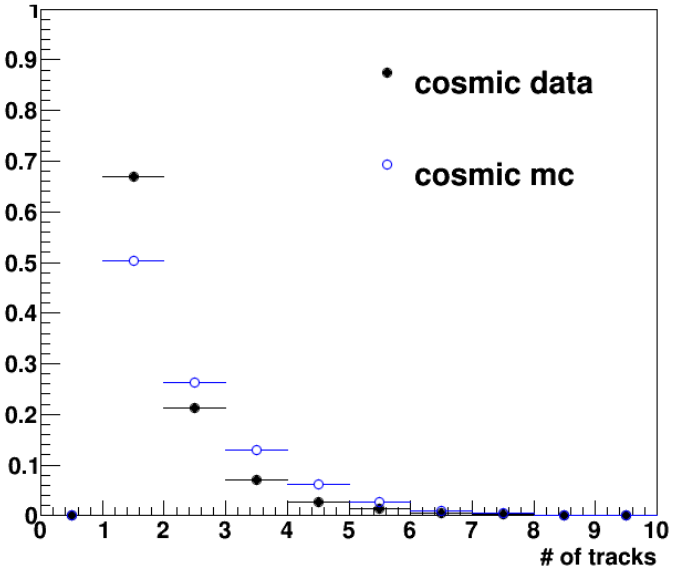
Vertex

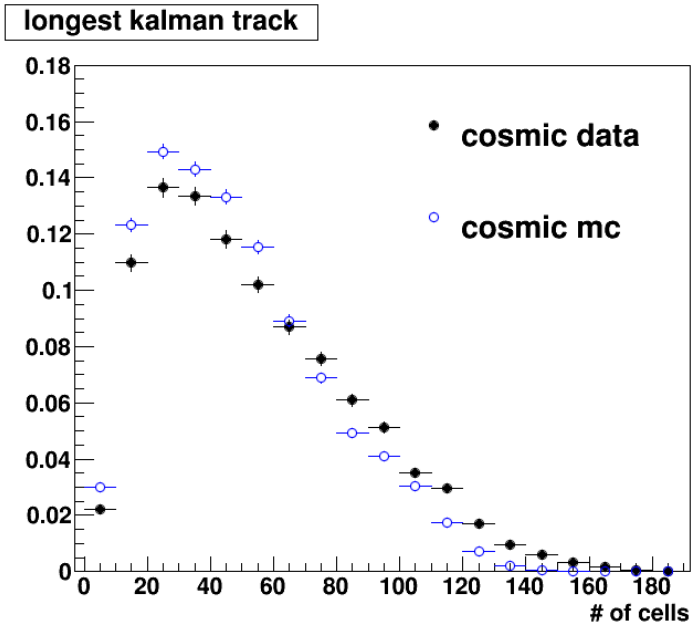

cosmic data
cosmic mc
0.1
0.08
0.06
0.04
0.02
0
-800
-600
-400
-200
0
200
400
600
800
V_x (cm)

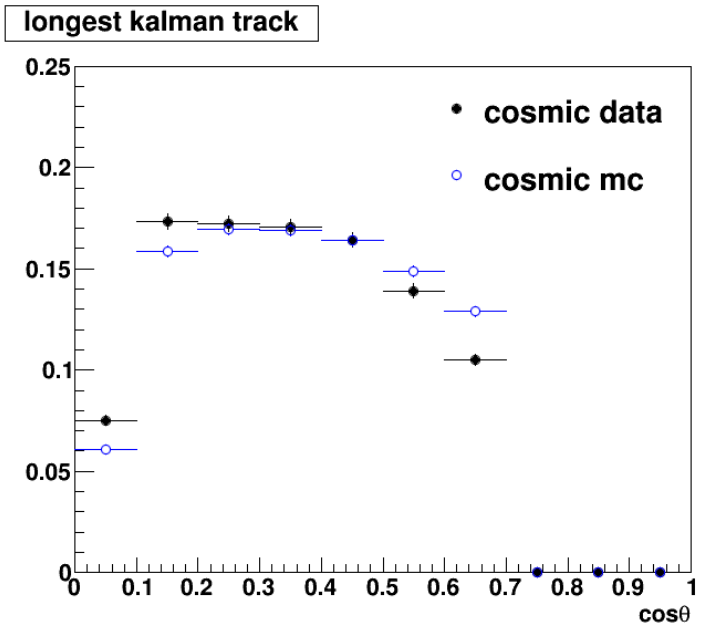

cosmic data
cosmic mc
0.3
0.25
0.2
0.15
0.1
0.05
0
0
100
200
300
400
500
600
700
800
V_y (cm)


cosmic data
cosmic mc
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
0
200
400
600
800
1000
V_z (cm)

Track


cosmic data
cosmic mc
# of tracks


longest kalman track
cosmic data
cosmic mc
# of cells


longest kalman track
cosmic data
cosmic mc
cosθ