

Updates on NuMI acceptance using TPC tracklength

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for

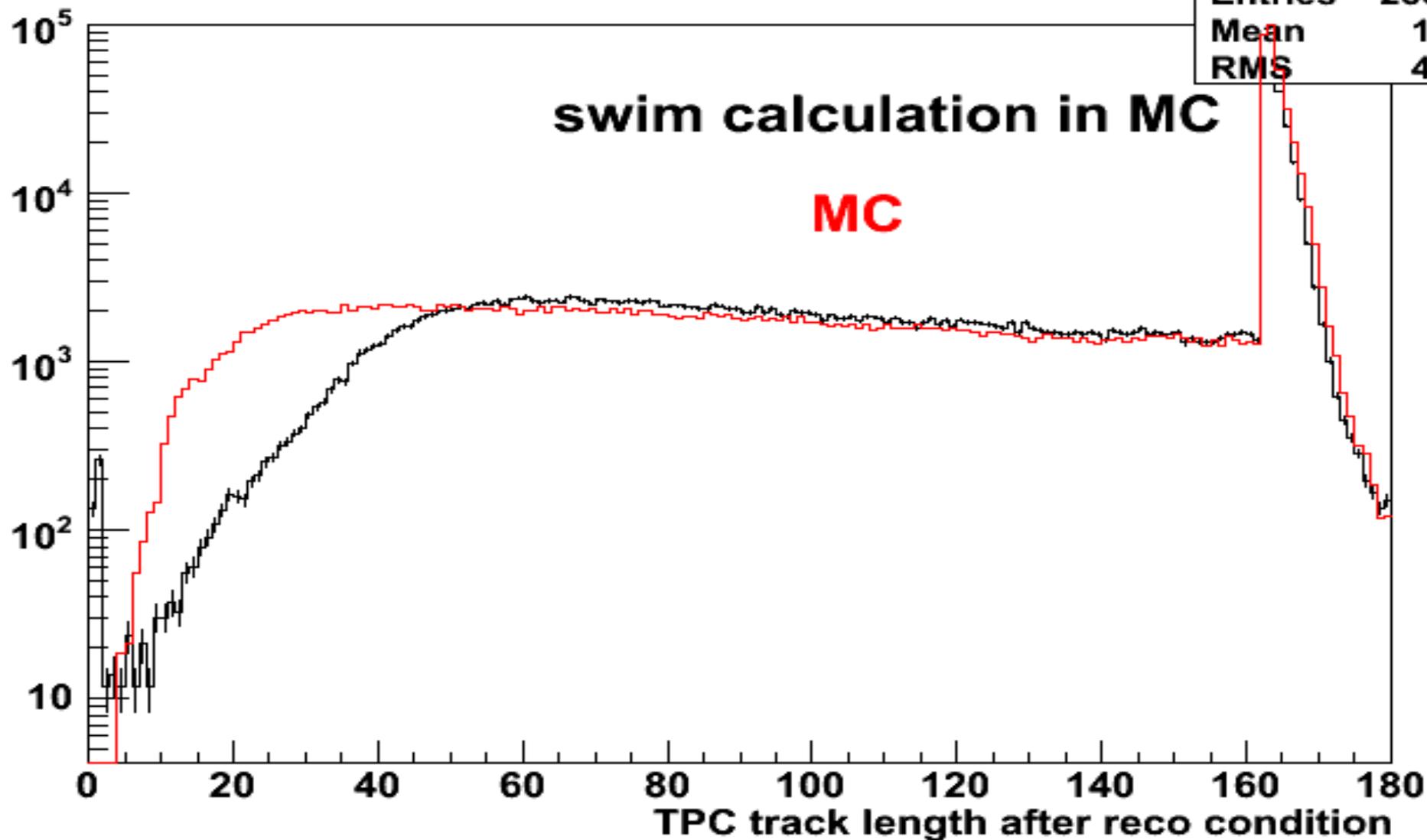
MIPP collaboration

14th December 2010

Track length in TPC in true space after matching with reco using swim for hadrons

htpcLen_hadron_swim_det

Entries	255504
Mean	135.7
RMS	41.35



Shown in 23rd Nov. meeting

Reasons for discrepancy between MC and swim calculation :

1) Bug found while doing the swim calculation :

GBKT (along Y axis) : GMIPPGeo returns the active gas volume along Y axis which is different from the GBKT extension along Y axis (GBKT lies in $-28.266 < y < 45.0$ (c.m.) whereas TPC gas volume lies between $-35.131 < y < 45.737$ (c.m.))

2)Using TPC active gas volume range along X axis is not correct :

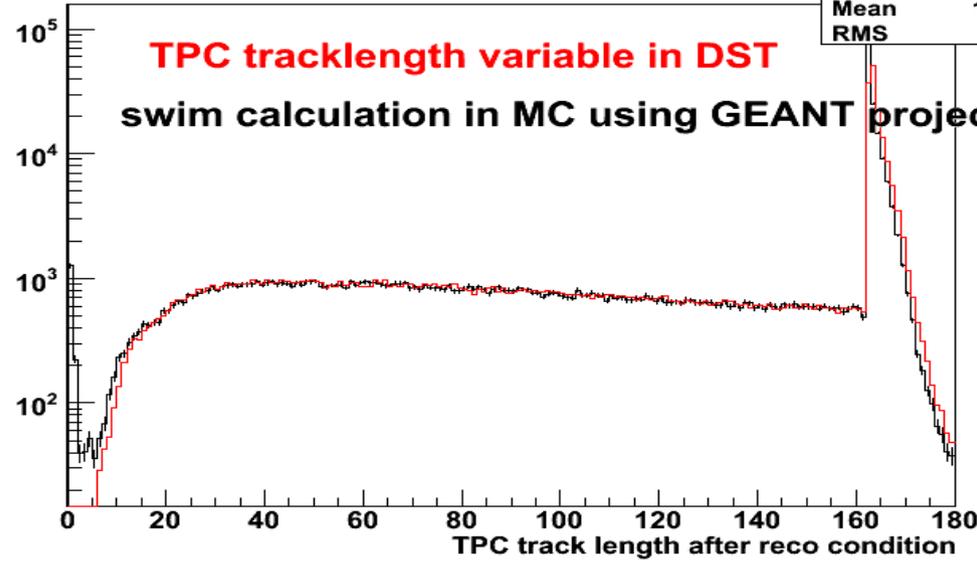
GPAD (along X axis) :- GMIPPGeo returns the active volume of TPC gas along X axis which is different from the GPAD extension along X axis. (GPAD lies in $-52.0 < x < 52.0$ (cm) whereas TPC gas volume lies in $-48.013 < x < 47.968$ (cm))

3) Different approach by GEANT and swimmer for getting the entry point of track from target to TPC front face :

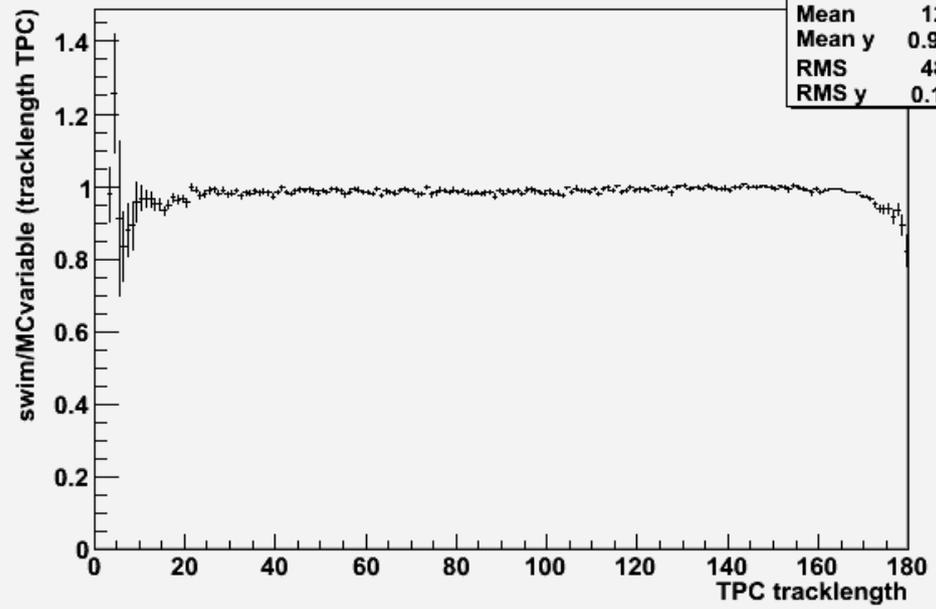
GEANT projects the vertex of the track from the target to the front face of the TPC using straight line projection with slope $dx/dz = dp_x/dp_z$ while swimmer swims the track from the vertex of track inside target to the TPC front face along dS ($dp_x/dS = dp_x/dp$)

Swim and MC variable comparison with swimmer using GEANT straight line projection from track vertex inside target to TPC front face, removing the GBKT bug and taking the correct GPAD extension along X axis.

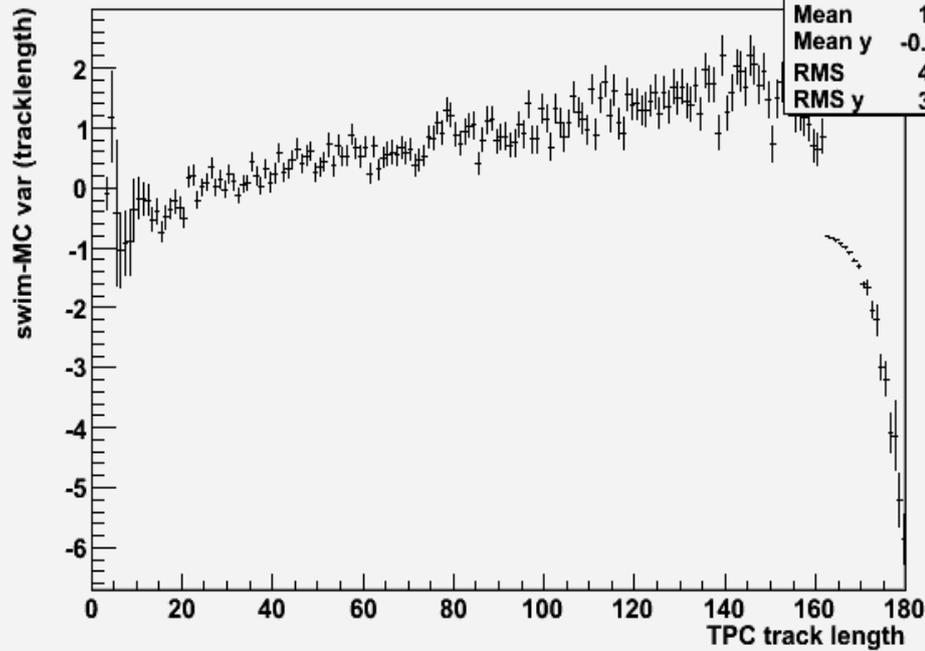
Track length in TPC in true space after matching with reco using swim for hadrons



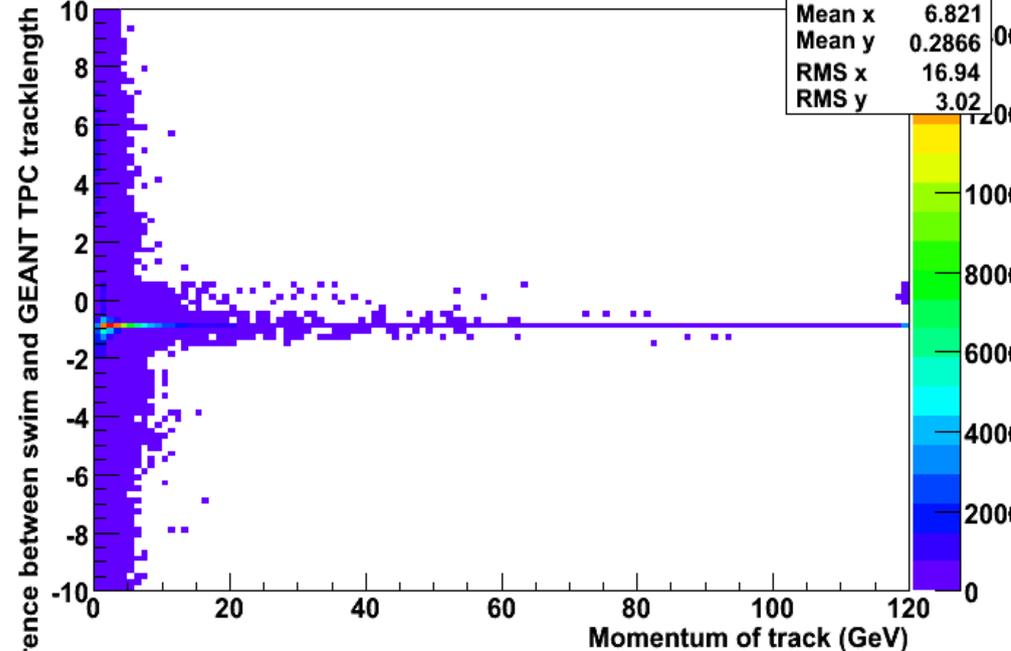
Ratio between swim and true



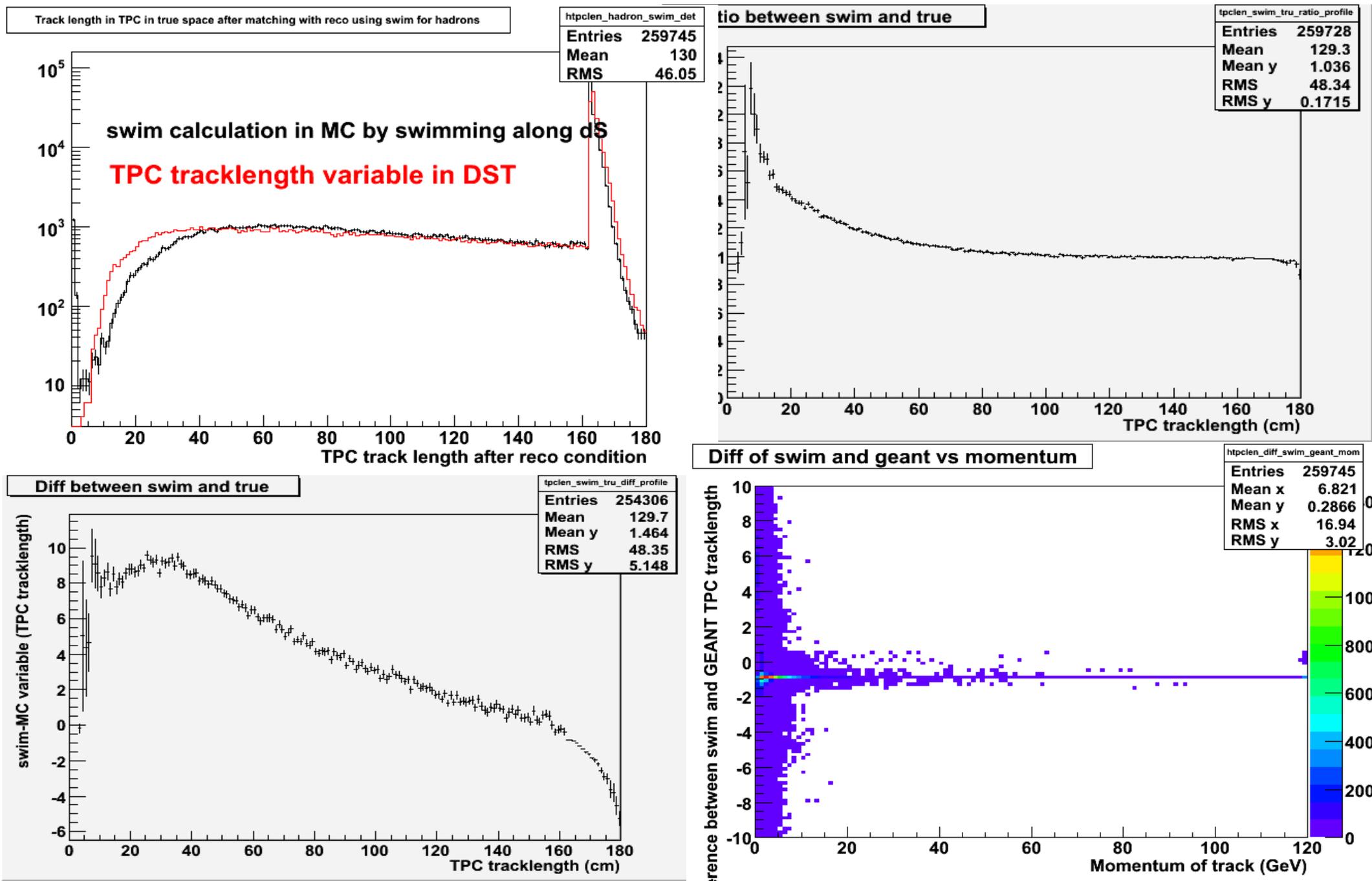
Diff between swim and true



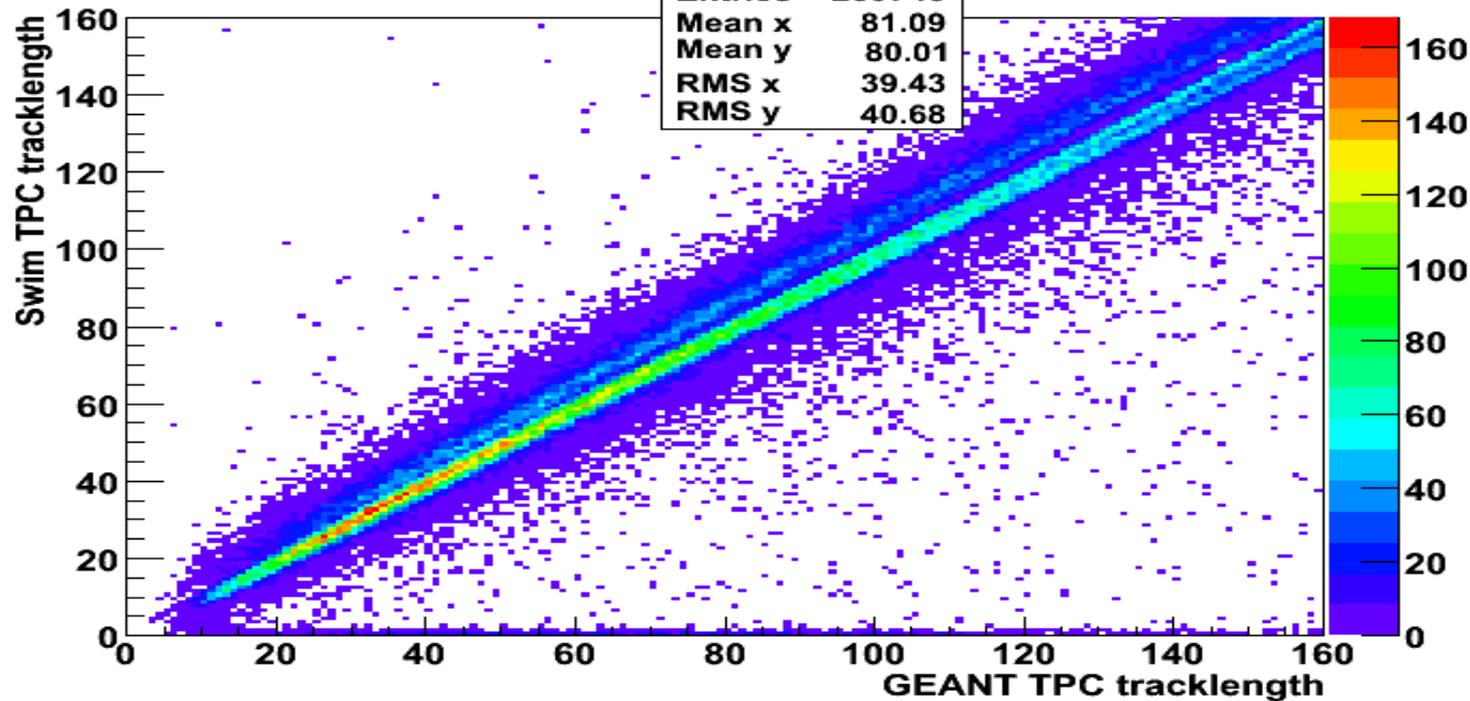
Diff of swim and geant vs momentum



Swim and MC variable comparison with swimmer swimming along dS ($dx/dS = dp_x/dp$) while GEANT using straight line projection ($dx/dz = dp_x/dp_z$) from track vertex inside target to the front face of TPC, also GBKT and GPAD issues are taken

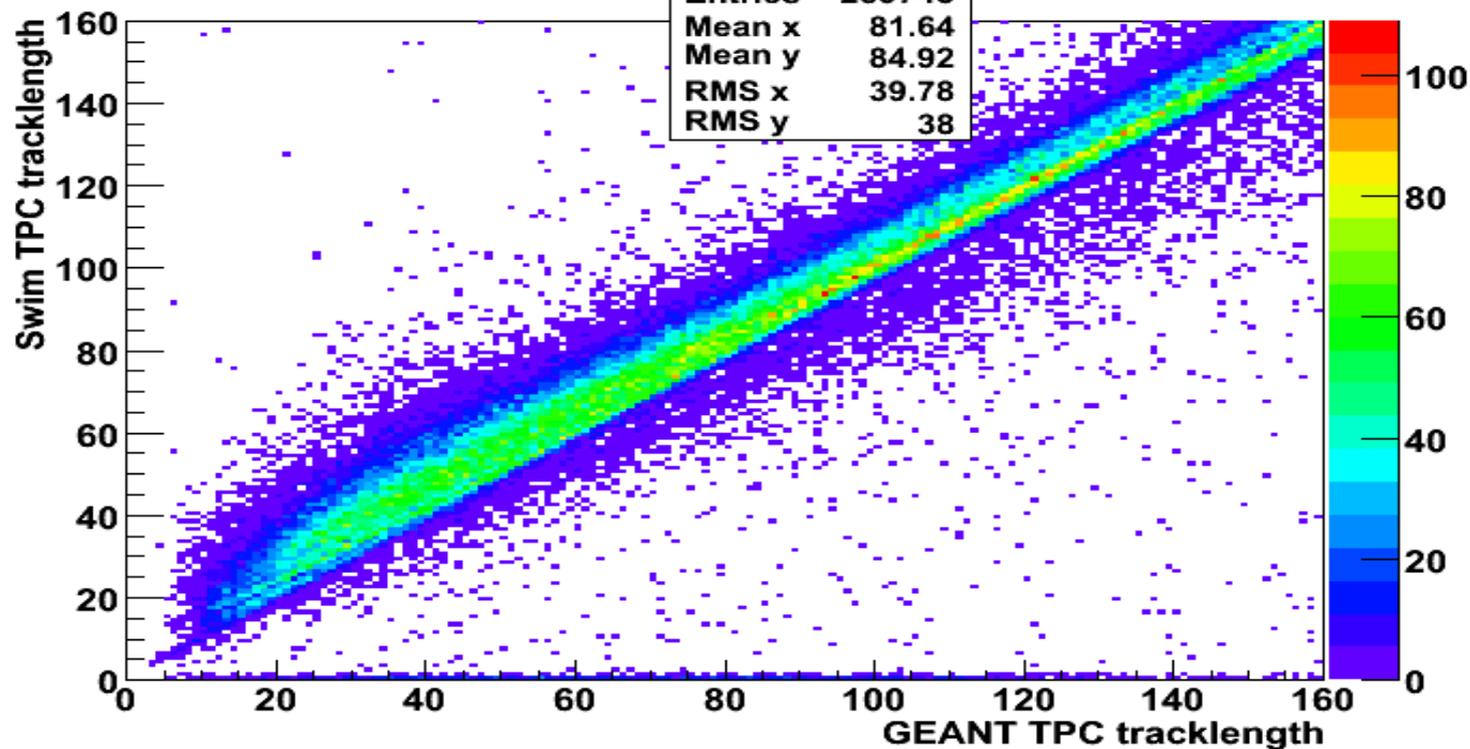


Geant vs Swim scatter plot



Swim TPC tracklength vs GEANT TPC tracklength with swimmer using GEANT straight line projection from track vertex inside target to TPC front face

Geant vs Swim scatter plot



Swim TPC tracklength vs GEANT TPC tracklength with swimmer swimming along dS ($dx/dS = dp_x / dp$) while GEANT using straight line projection ($dx/dz = dp_x / dp_z$) from track vertex inside target to the front face of TPC