Progress Report

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Khushi Singla
Lokesh Kumar
Department of Physics, Panjab University, Chandigarh

Outline

- Effect of condition, ***if(mc_part.getGeneratorStatus==0) continue;***
- Truth vertices of files from 3 sources.
- Actual reason for lesser resolution in previous plots.
- New Plots for S3 files available at:

  S3/eictest/EPIC/FULL/23.08.0/epic_craterlake/DIS/NC/18x275/minQ2=10/pythia8NCDIS_18x275_minQ2=10_beamEffects_xAngle=-0.025_hiDiv_1.*.edm4hep.root

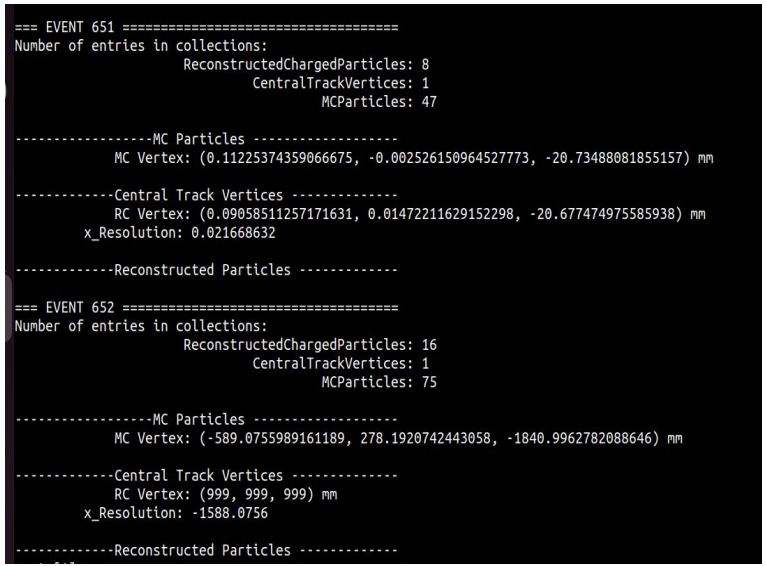
- New Plots for locally generated 2k events at (0, 0, 0).
- New Plots for Brian's Files available at:

  /gpfs/mnt/gpfs02/eic/bpage/home/EPIC/fromOlga/d0Sample/recoOut/noBurn

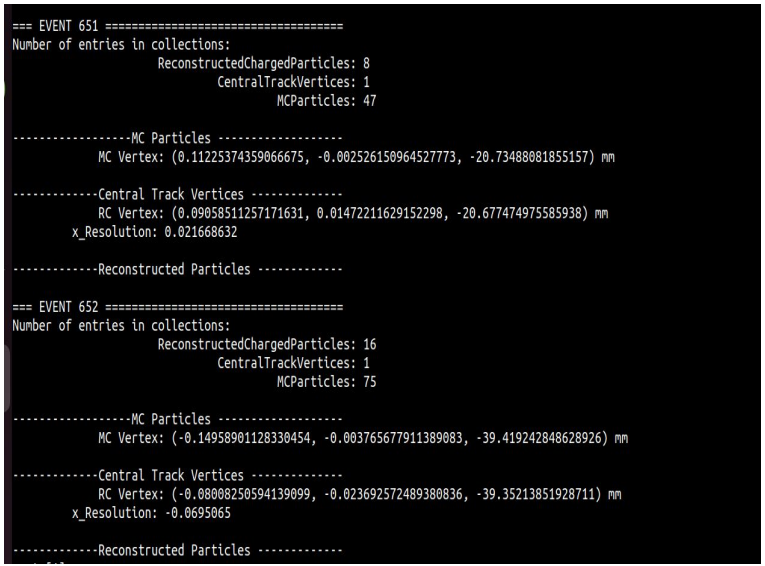
Effect of the condition

- The reason for lesser standard deviation of resolutions from S3 files was NOT the condition, ***if(mc_part.getGeneratorStatus==0) continue;***
- However, this condition DOES help in improving the choice of the MC vertex (and hence, the resolution) for some events like in event no. 652 here:

Without Condition



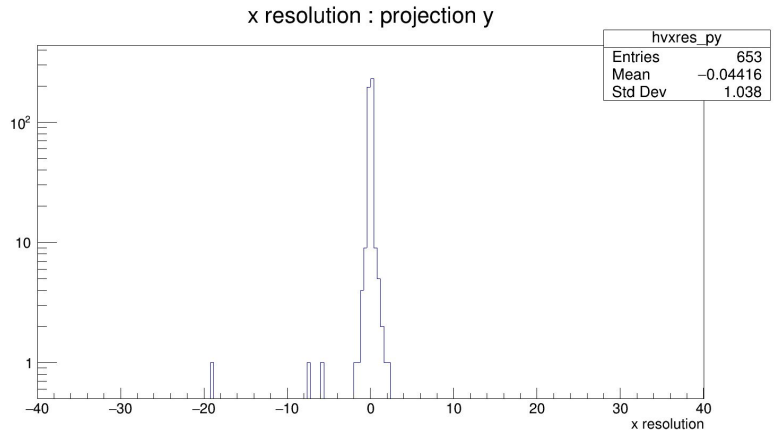
With Condition



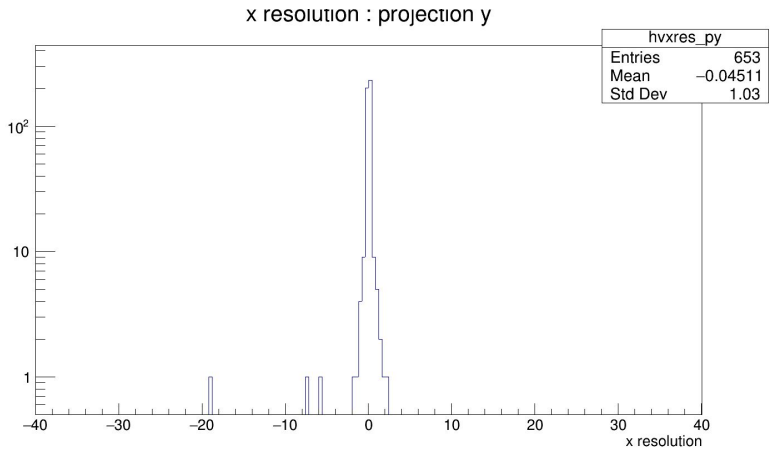
Effect of the condition on resolution

- Due to better MC vertex choice, we get very small improvement in standard deviation of resolution.
- X component:

Without Condition



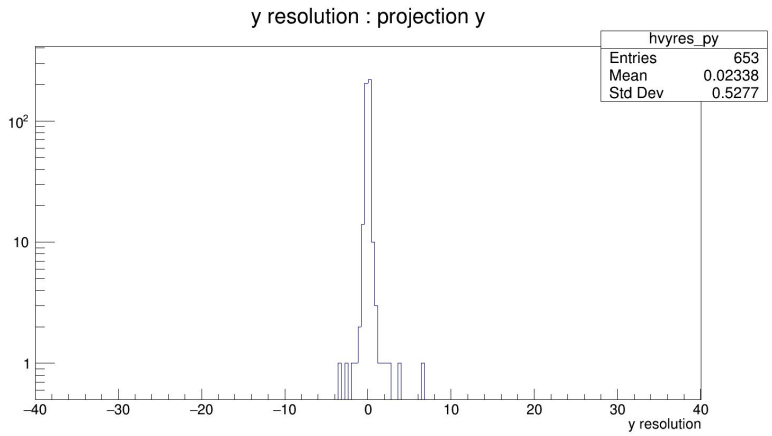
With Condition



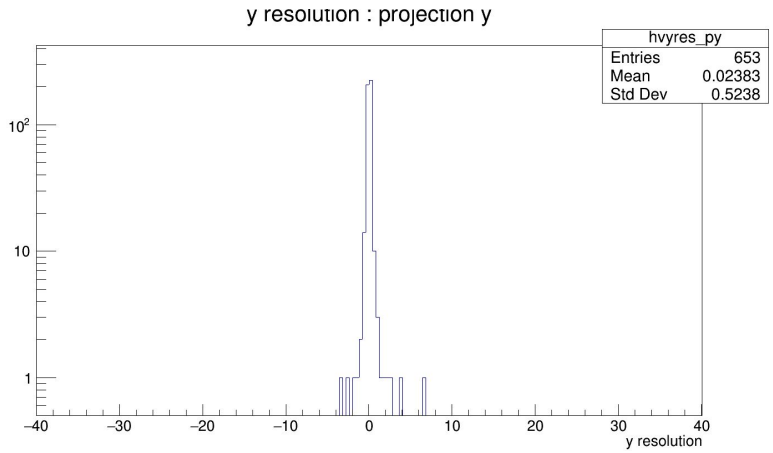
Effect of the condition on resolution

- Y component:

Without Condition



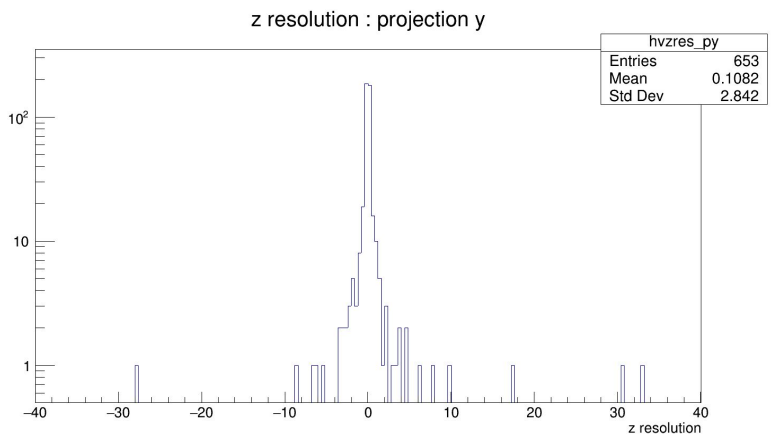
With Condition



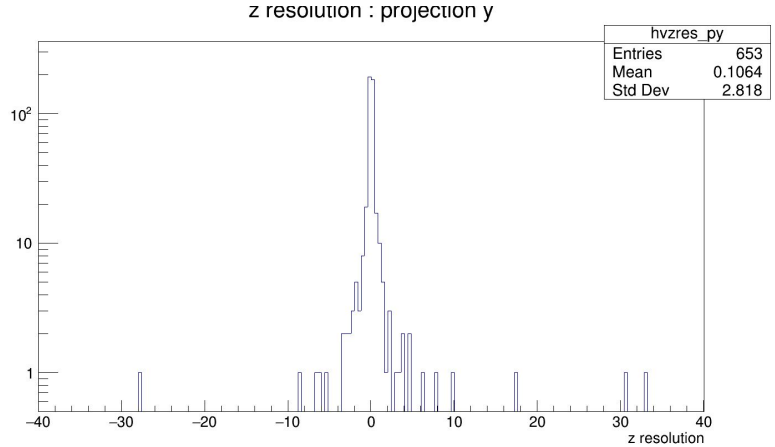
Effect of the condition on resolution

- Z component:

Without Condition



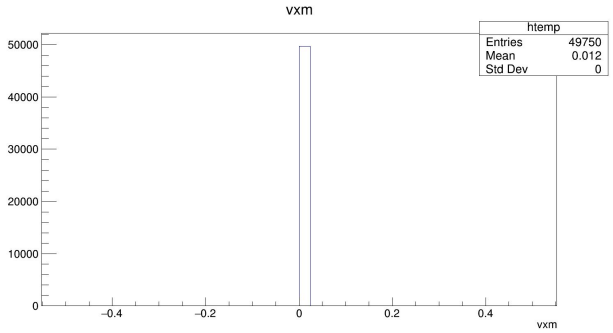
With Condition



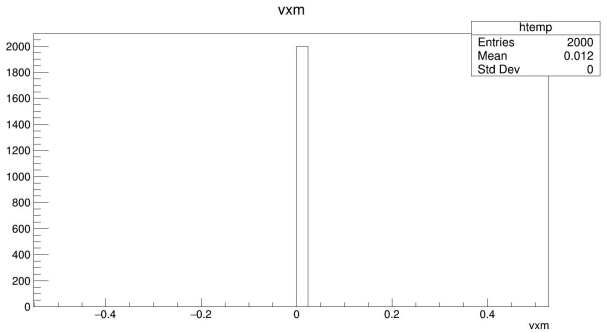
Truth Vertices: x component

- MC vertices of different files calculated WITH the condition ***if(mc_part.getGeneratorStatus==0) continue;*** are shown:

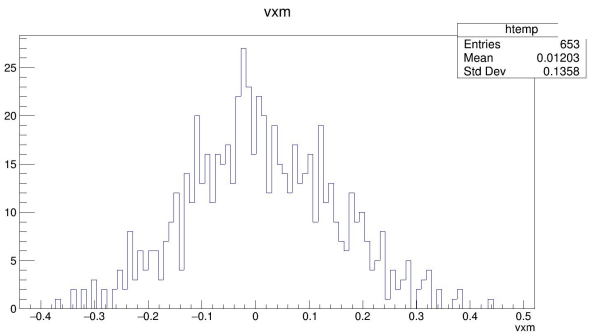
Brian's Files



Local 2k Events

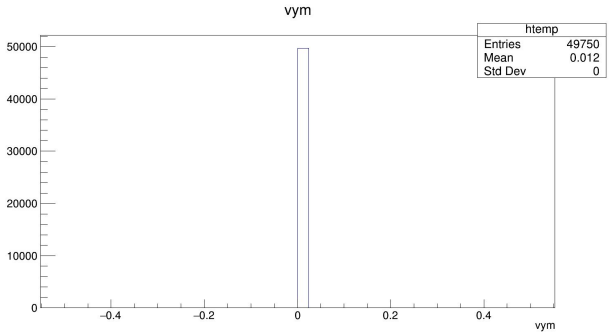


S3 Files

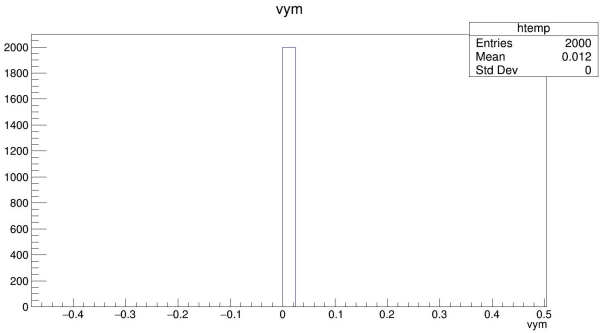


Truth Vertices: y component

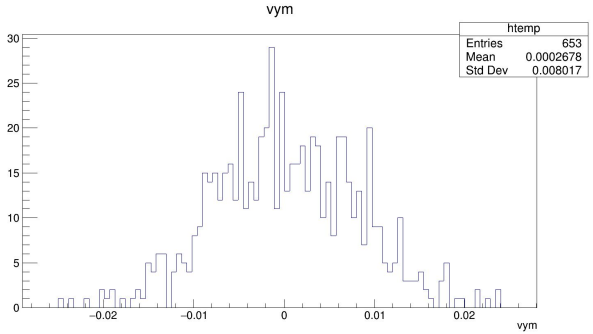
Brian's Files



Local 2k Events

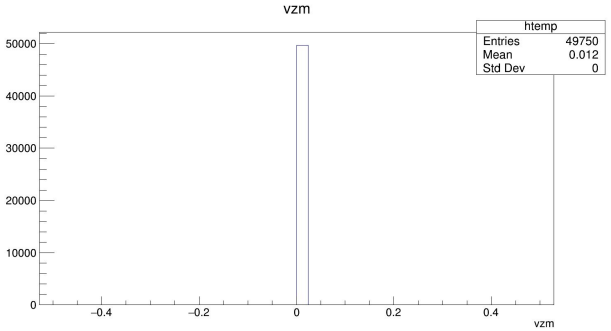


S3 Files

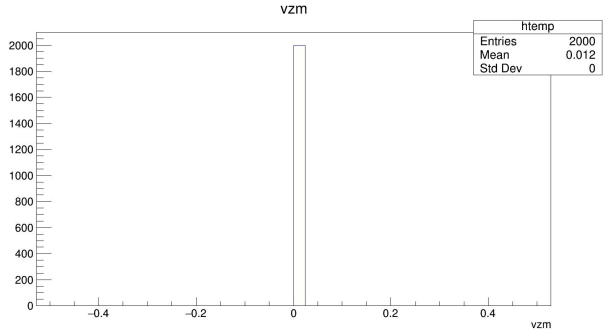


Truth Vertices: z component

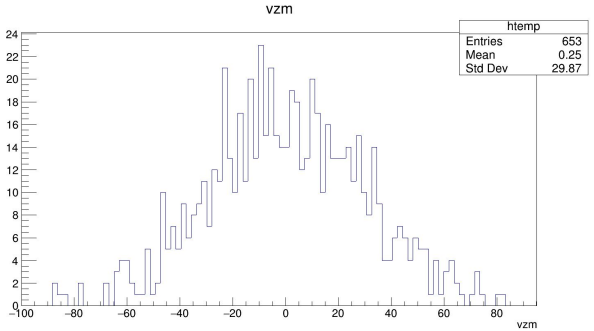
Brian's Files



Local 2k Events

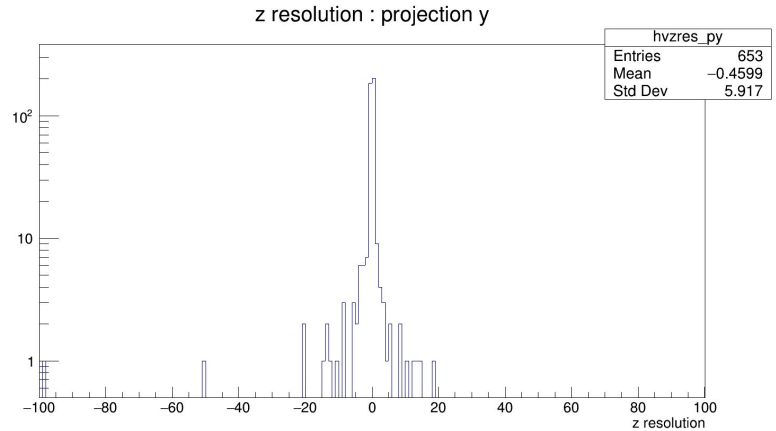


S3 Files



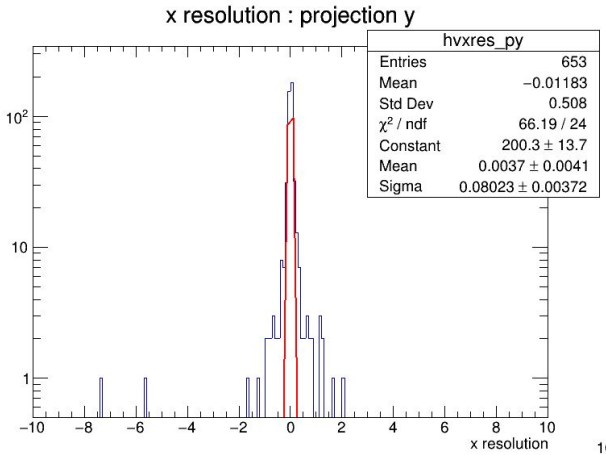
Reason for lesser resolution earlier

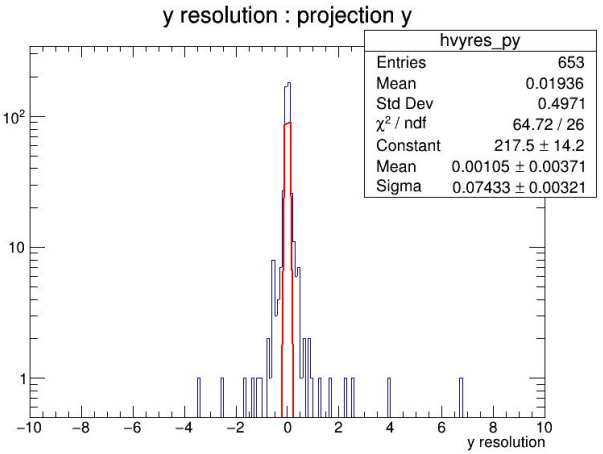
- The reason I was getting the improved resolution was because I made a mistake to limit the range of all my histograms from -1 to 1 with a motive to obtain gaussian fitting.
- But this range is not suitable for ALL the vertex resolutions as some of them have large standard deviations as shown here for z resolution of an S3 file.

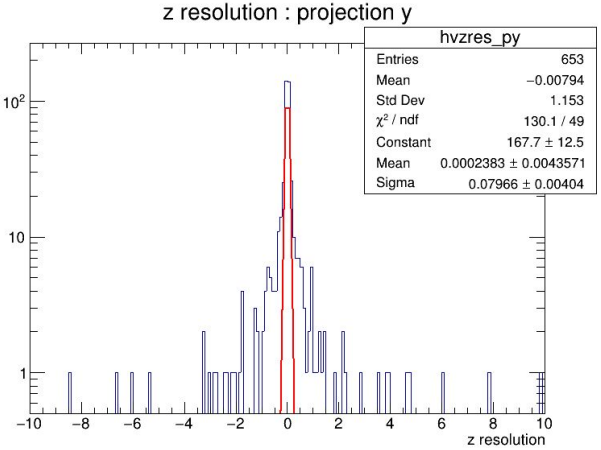


- So, I obtained the fitted plots with **longer** range (in subsequent slides)

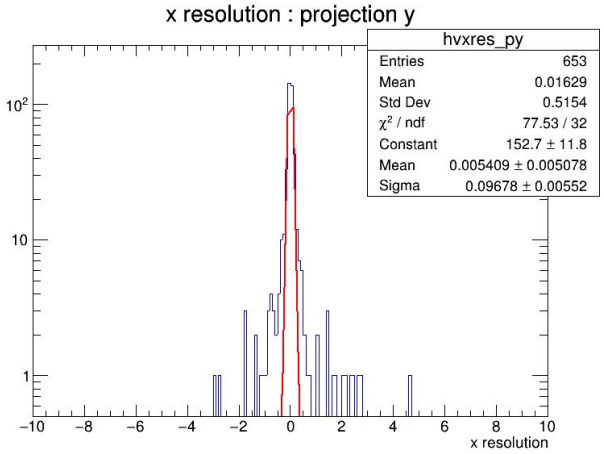
New Fitted Plots: S3 File No. 0000

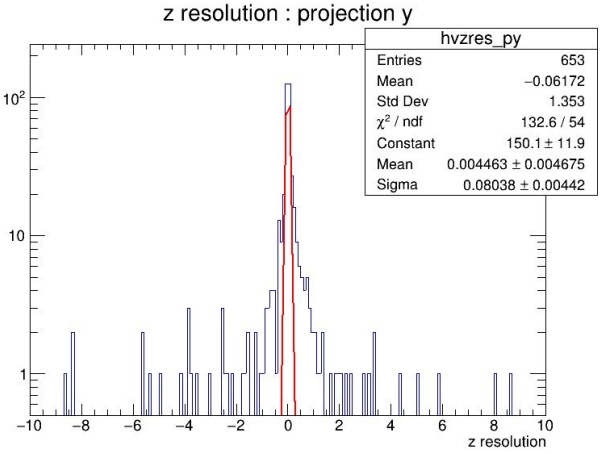


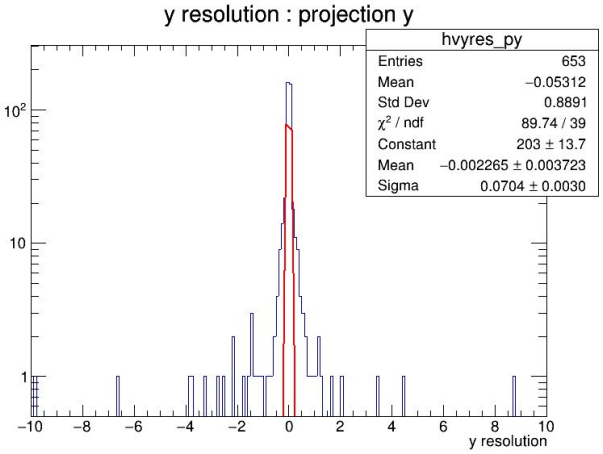




New Fitted Plots: S3 File No. 0001



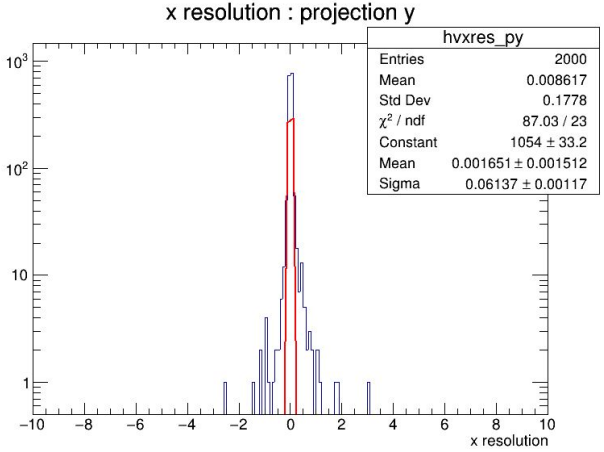


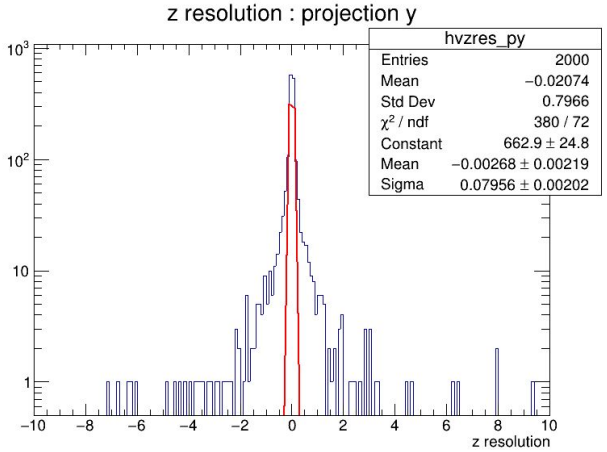


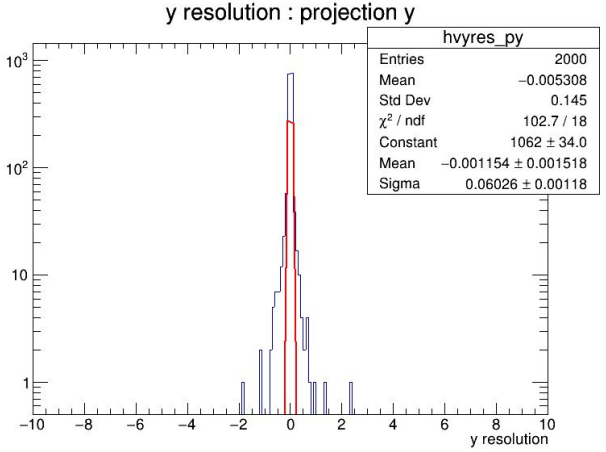
Locally Generated 2k DIS events

- Simulated 2000 events in PYTHIA with following specifications:
  - Electron Beam Energy = 18 GeV
  - Proton Beam Energy = 275 GeV
  - Min Q square = 10 GeV^2
  - With Neutral Current

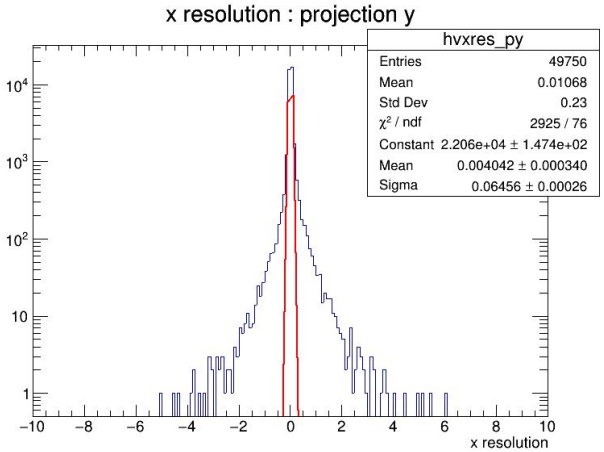
New Fitted Plots: 2k DIS events

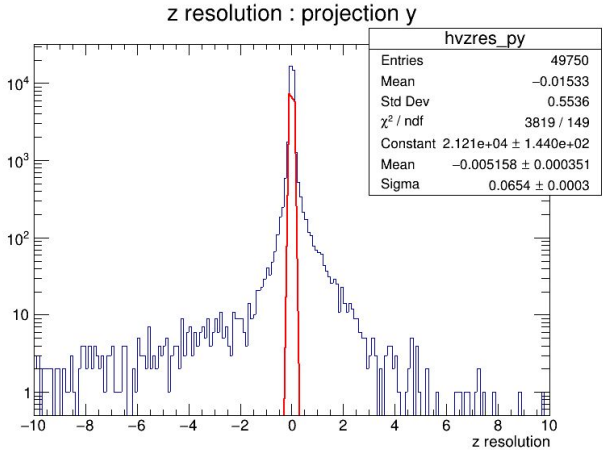


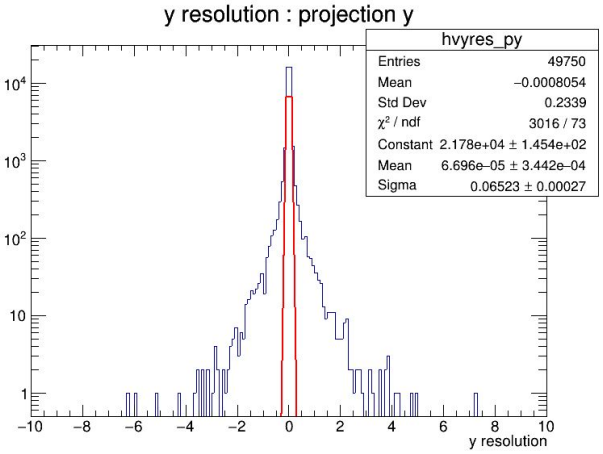




New Fitted Plots: Brian's Files







Conclusions

Standard Deviations of Vertex Resolution

		Without Gaussian Fitting			With Gaussian Fitting		
		σ_x	σ_y	σ_z	σ_x	σ_y	σ_z
S3 Files	File No. 0000	0.508	0.4971	1.153	0.08023	0.07433	0.07966
	File No. 0001	0.5154	0.8891	1.353	0.09678	0.0704	0.08038
Locally generated DIS events		0.1778	0.145	0.7966	0.06137	0.06026	0.07956
Brian's Files		0.23	0.2339	0.5536	0.06456	0.6523	0.0654

Next Goals and comments

- To run simulations of 2k x10 and x100 events and run analysis.
- To simulate events with minimum Q squared = 1.
- To generate events at vertex a bit away from (0, 0, 0).

Please provide your comments and suggestions about any changes that I should have made in the analysis.

Thank You!