2017 EMTF pT Resolution

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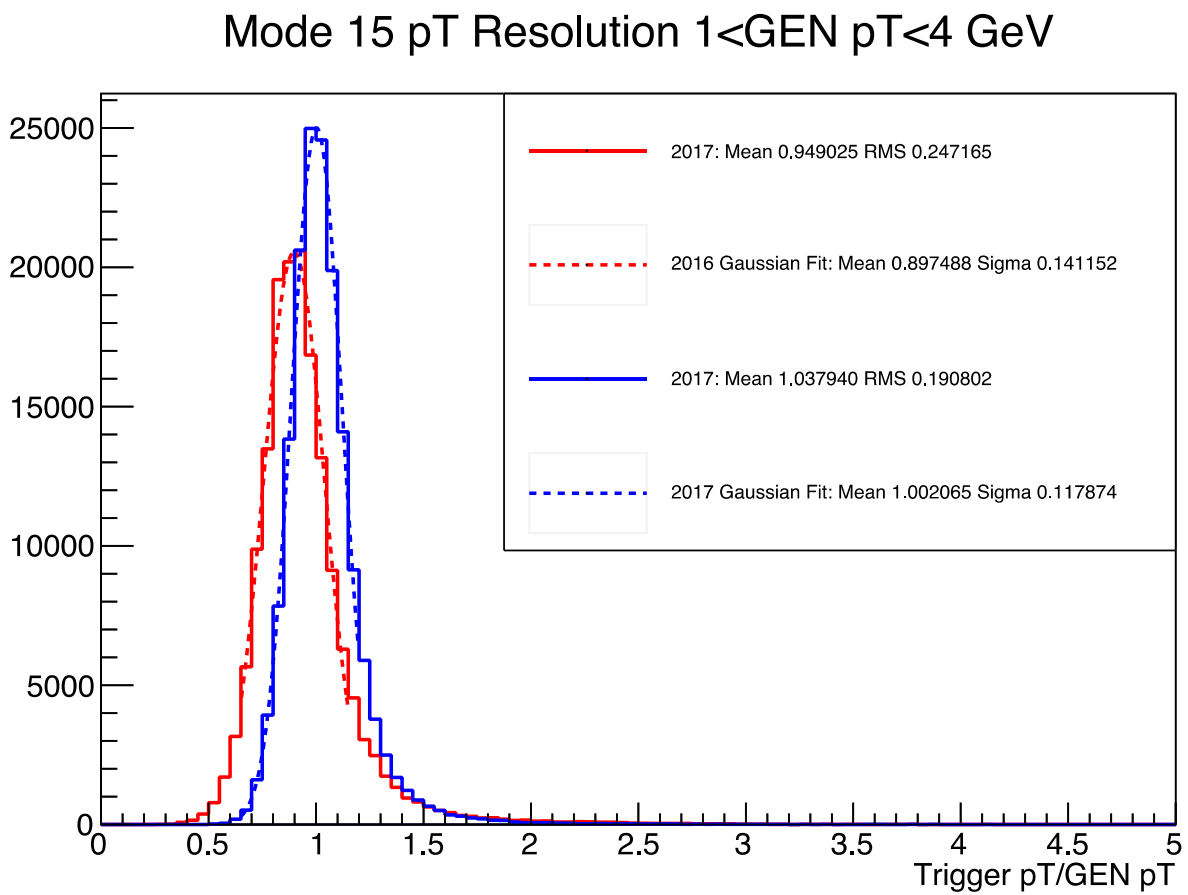
EMTF Working Meeting

Selections

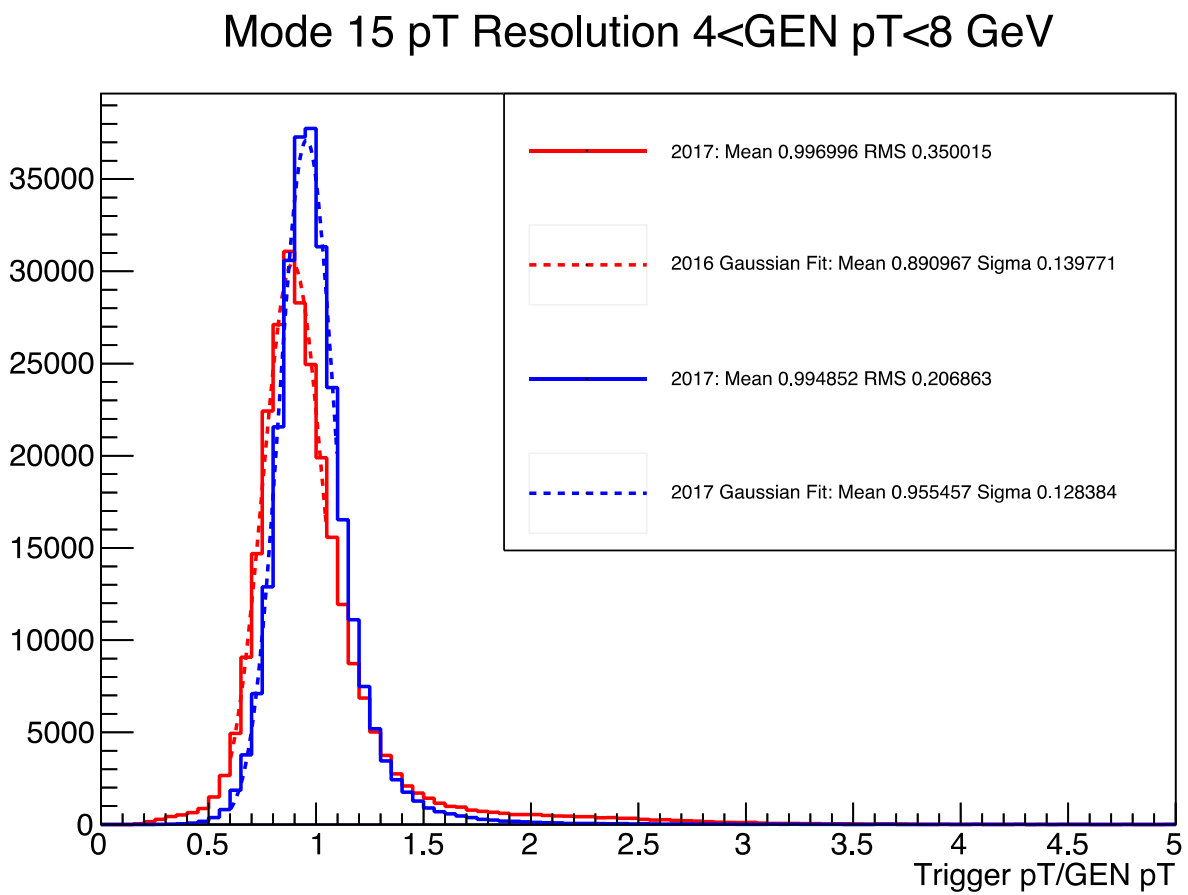
- All track modes
  - File directory: /afs/cern.ch/work/a/abrinke1/public/EMTF/PtAssign2017/files/*invPtTarg_invPtWgt_MODE*bitCompr_RPC.root
- Look at test trees for each mode
  - Look into four ranges: 1-4, 4-8, 8-16, 16-32 GeV
  - Require EMTF_mode = TRK_mode
  - Require the tracks to be CSC-only
  - Plot $\frac{Trigger\ pT}{GEN\ pT}$ for 2016 and 2017 trigger (2016 trigger pT divided by 1.4)
  - Fit core distribution with gaussian function

Four station track

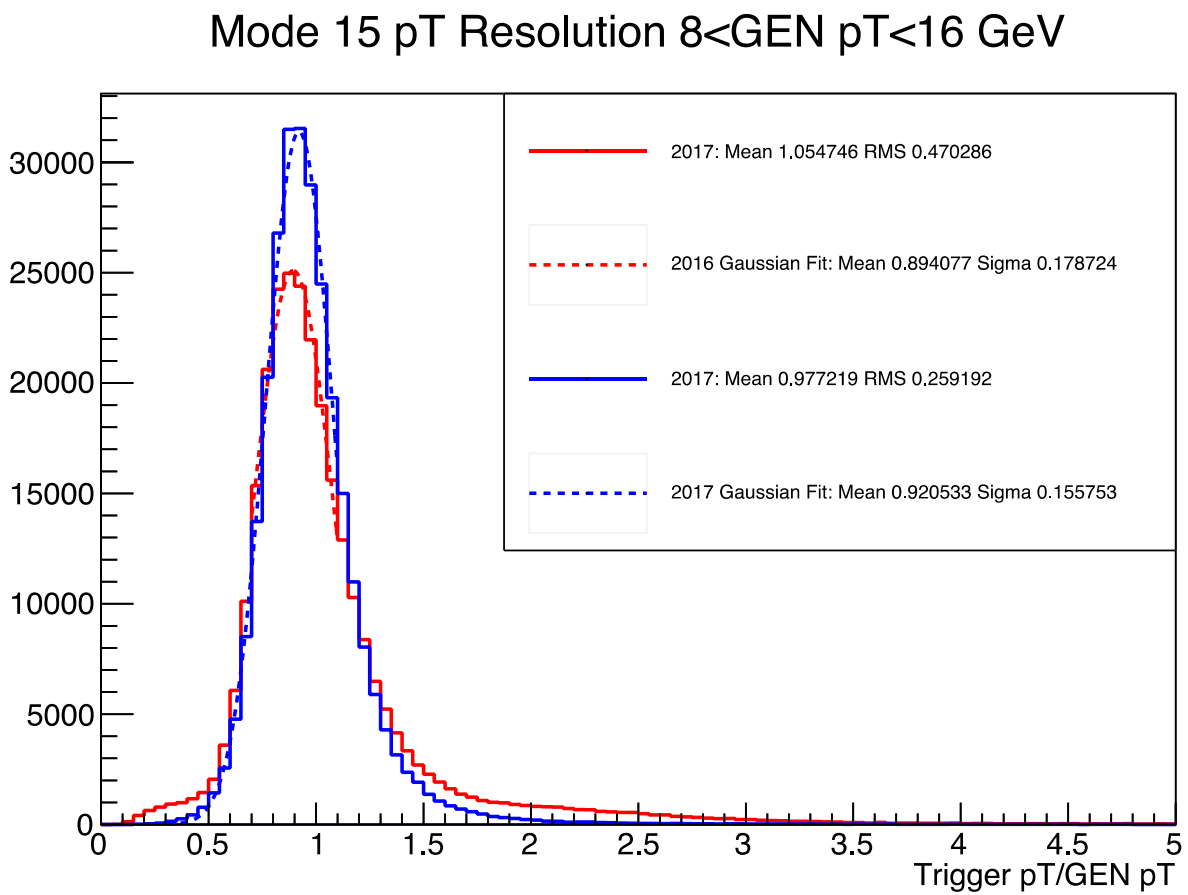
Mode 15 (station 1,2,3,4)



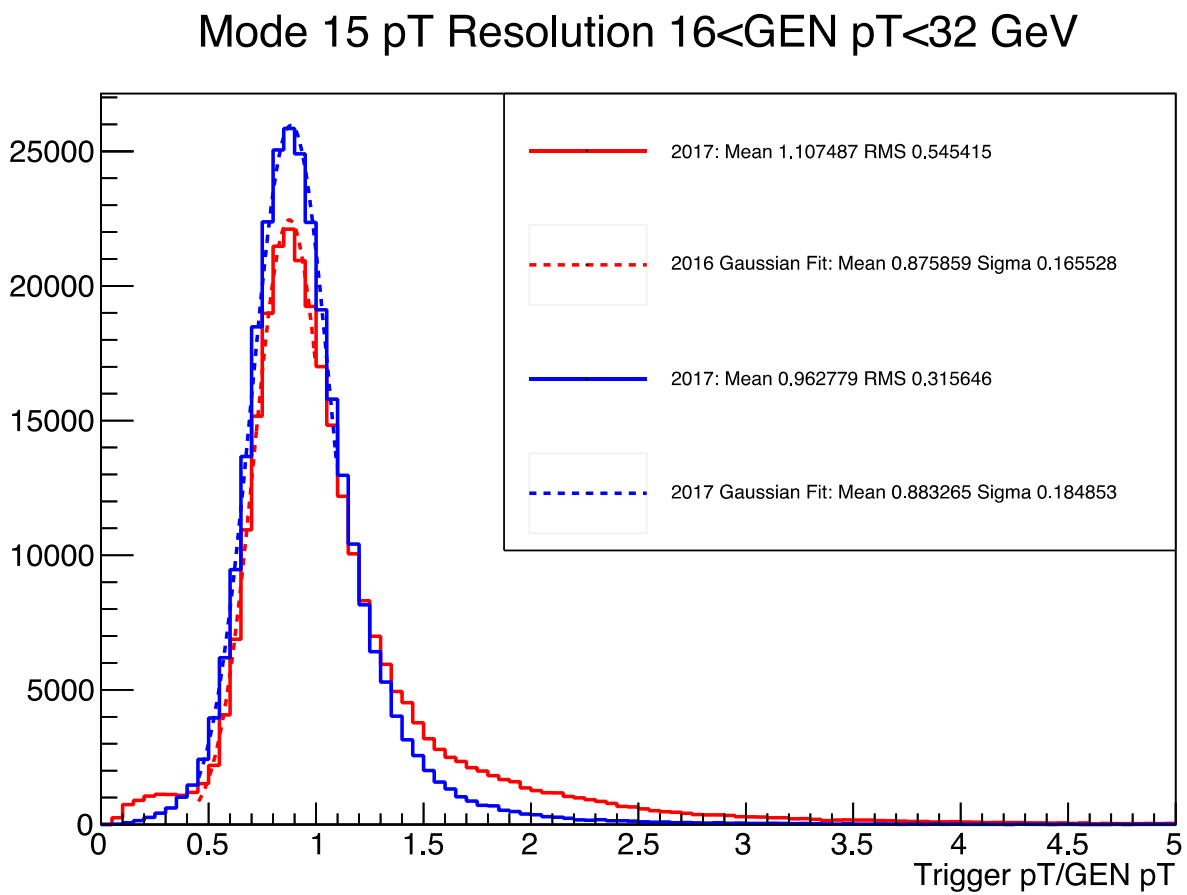
Mode 15 (station 1,2,3,4)



Mode 15 (station 1,2,3,4)

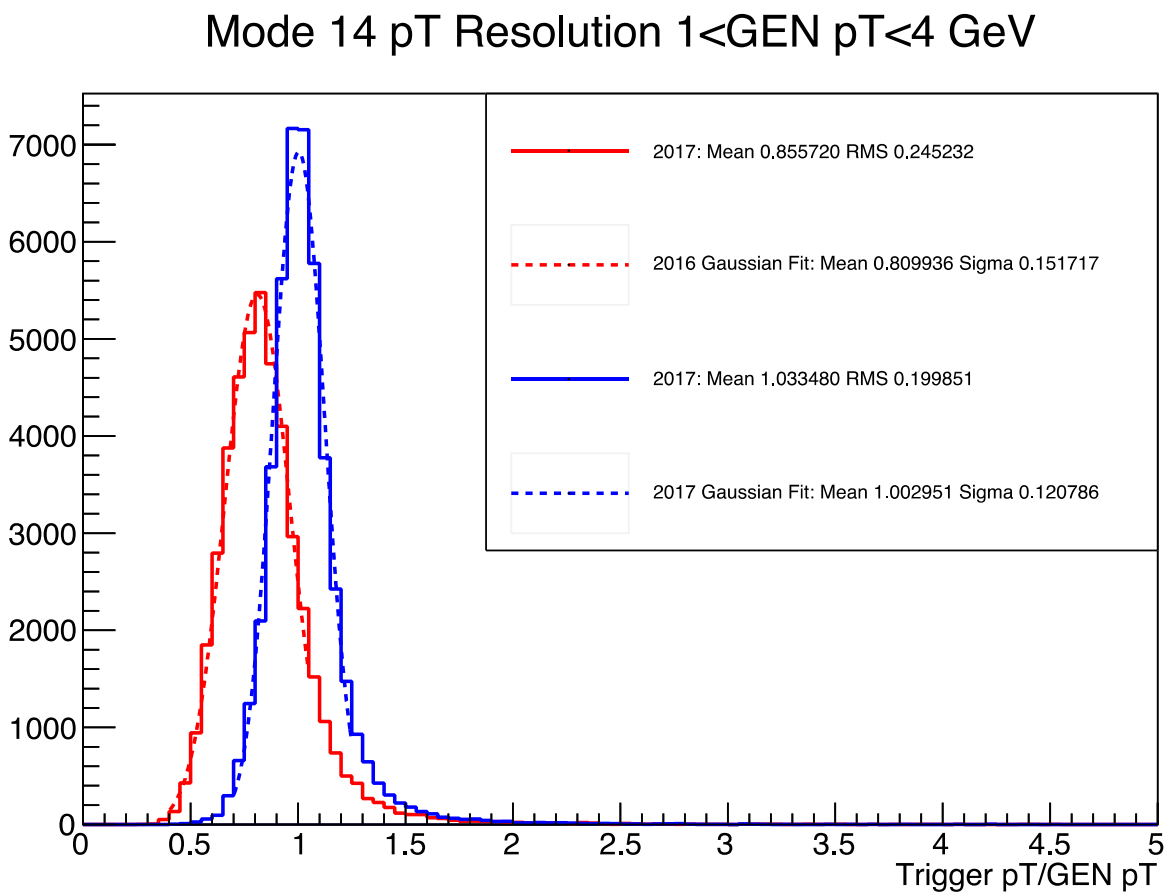


Mode 15 (station 1,2,3,4)

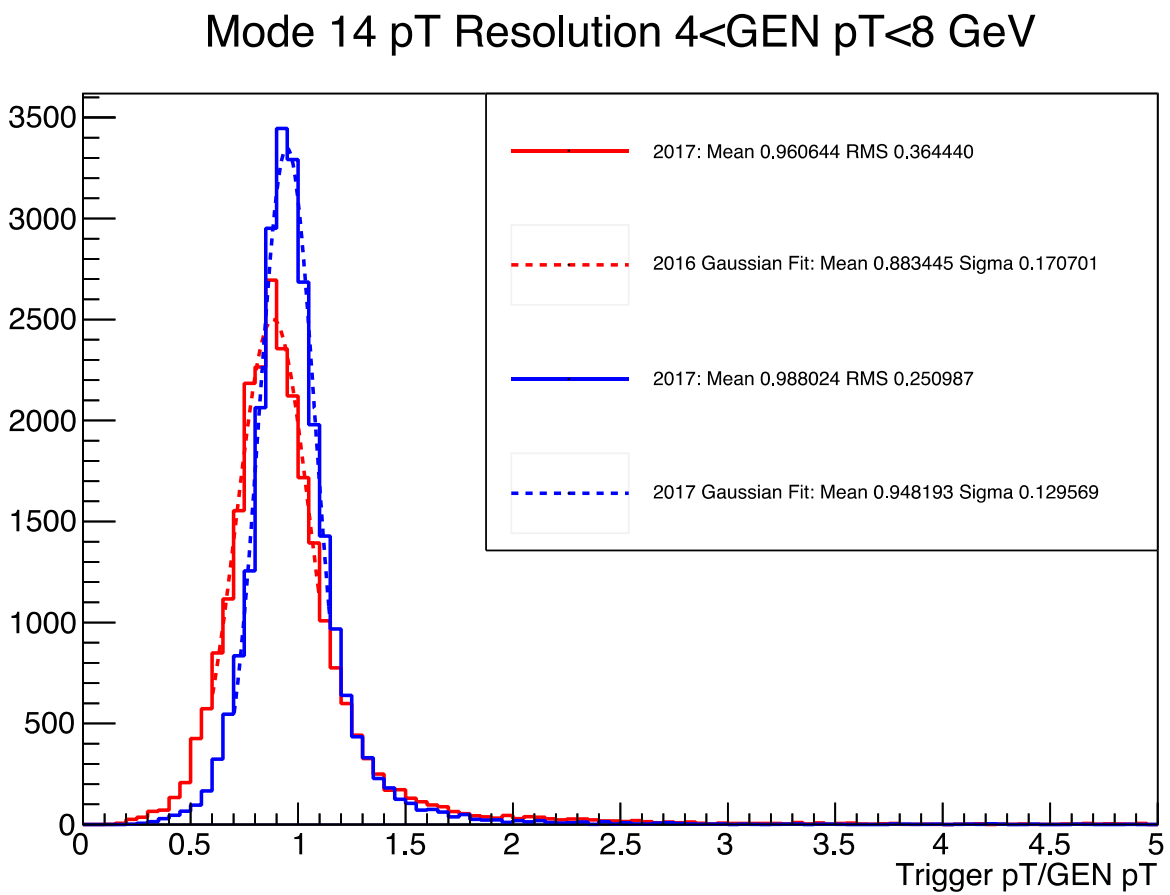


Three station track

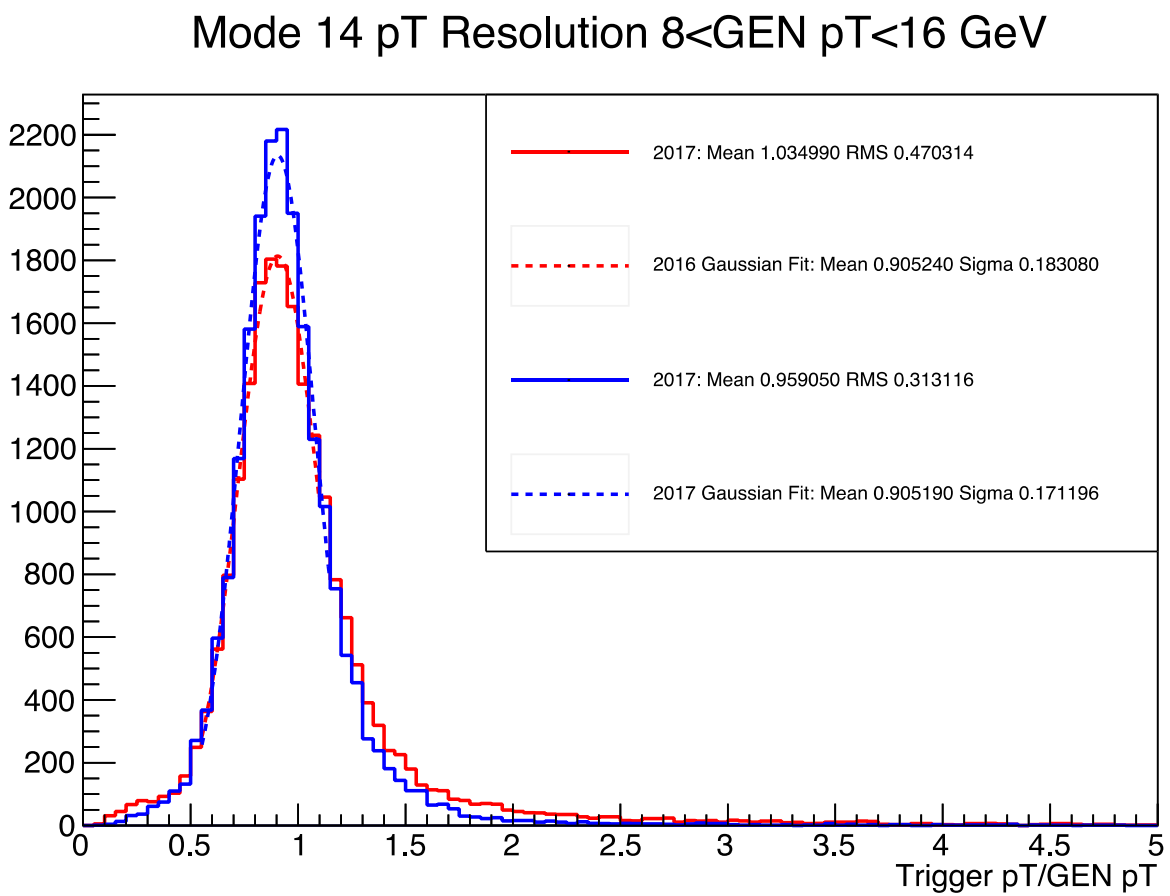
Mode 14 (station 1,2,3)



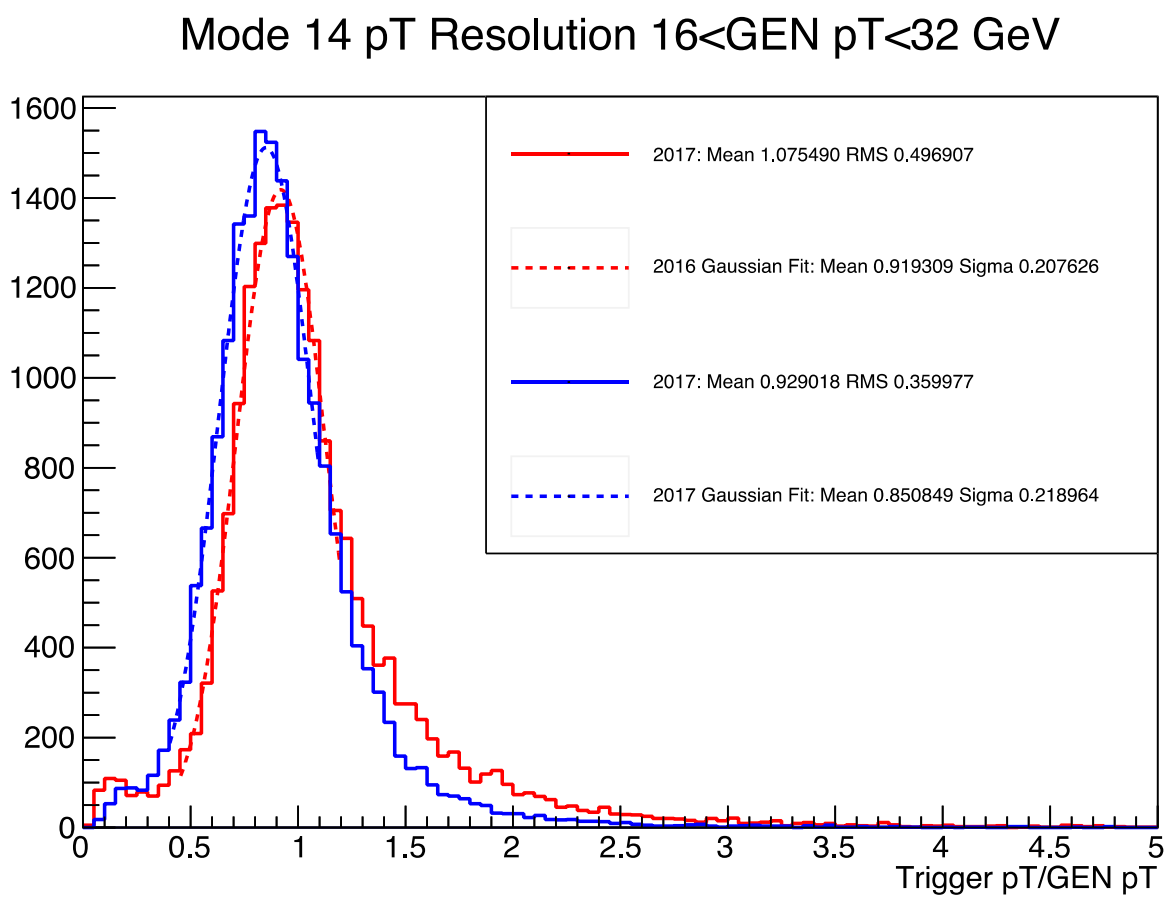
Mode 14 (station 1,2,3)



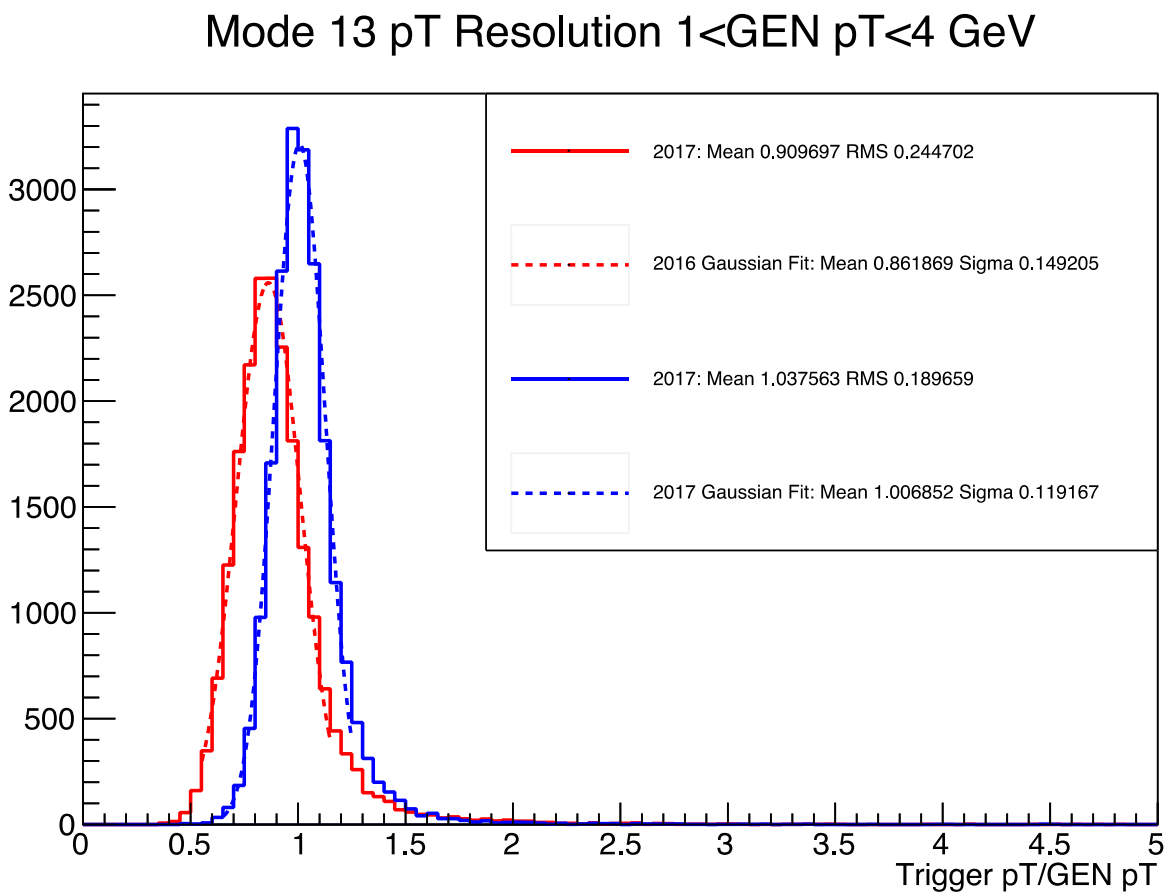
Mode 14 (station 1,2,3)



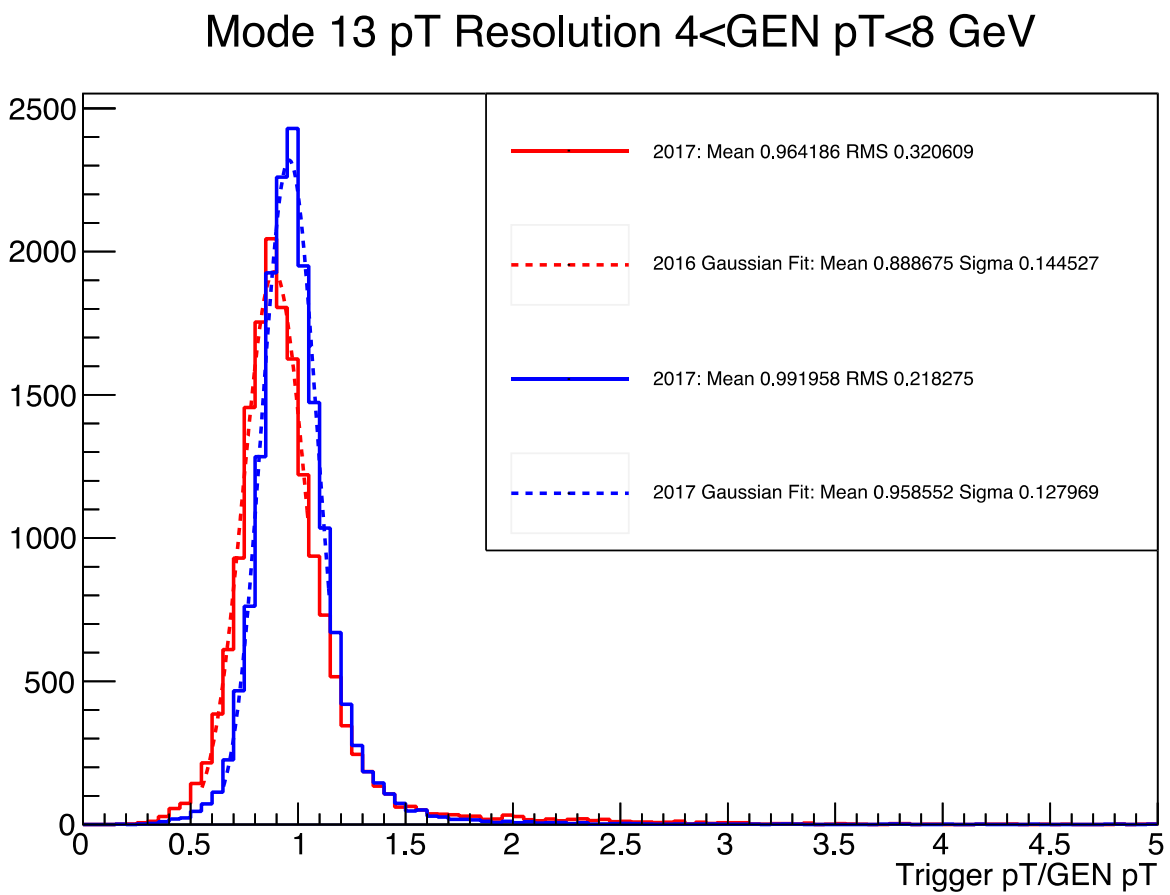
Mode 14 (station 1,2,3)



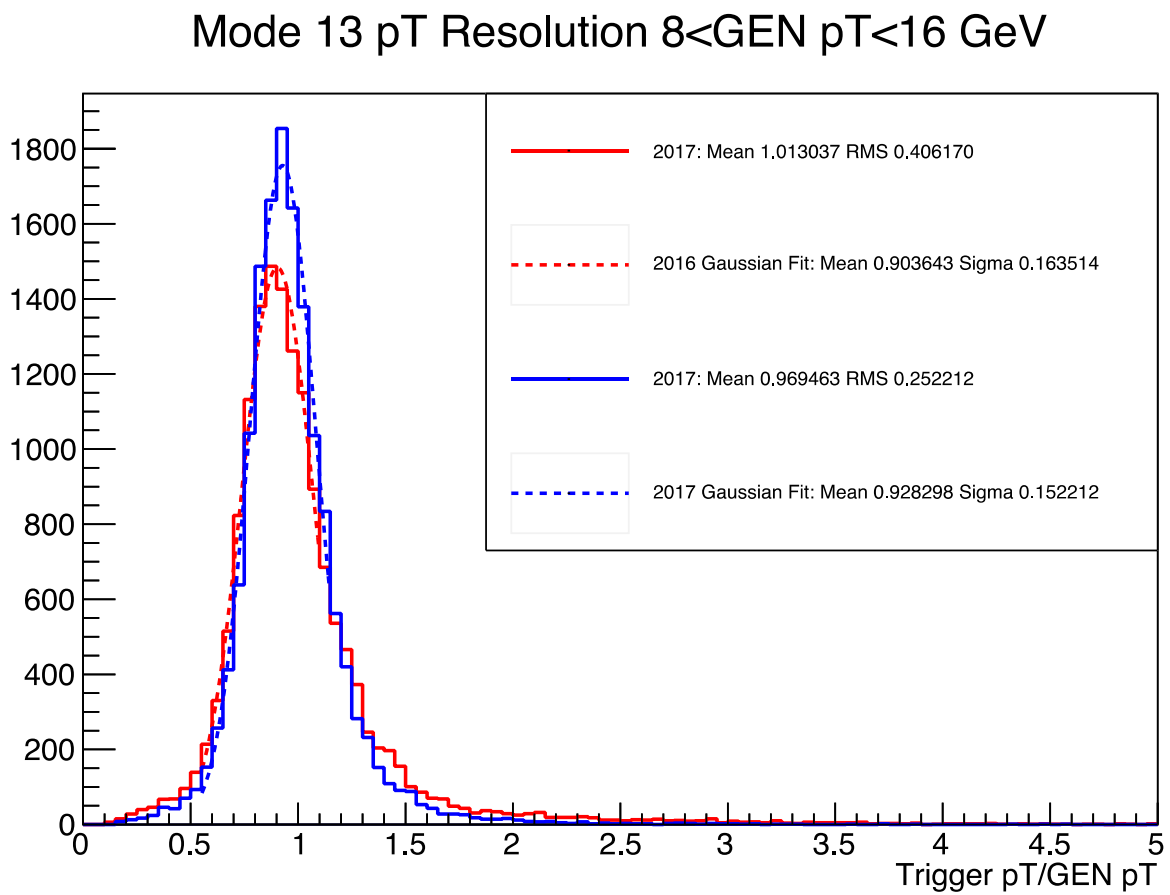
Mode 13 (station 1,2,4)



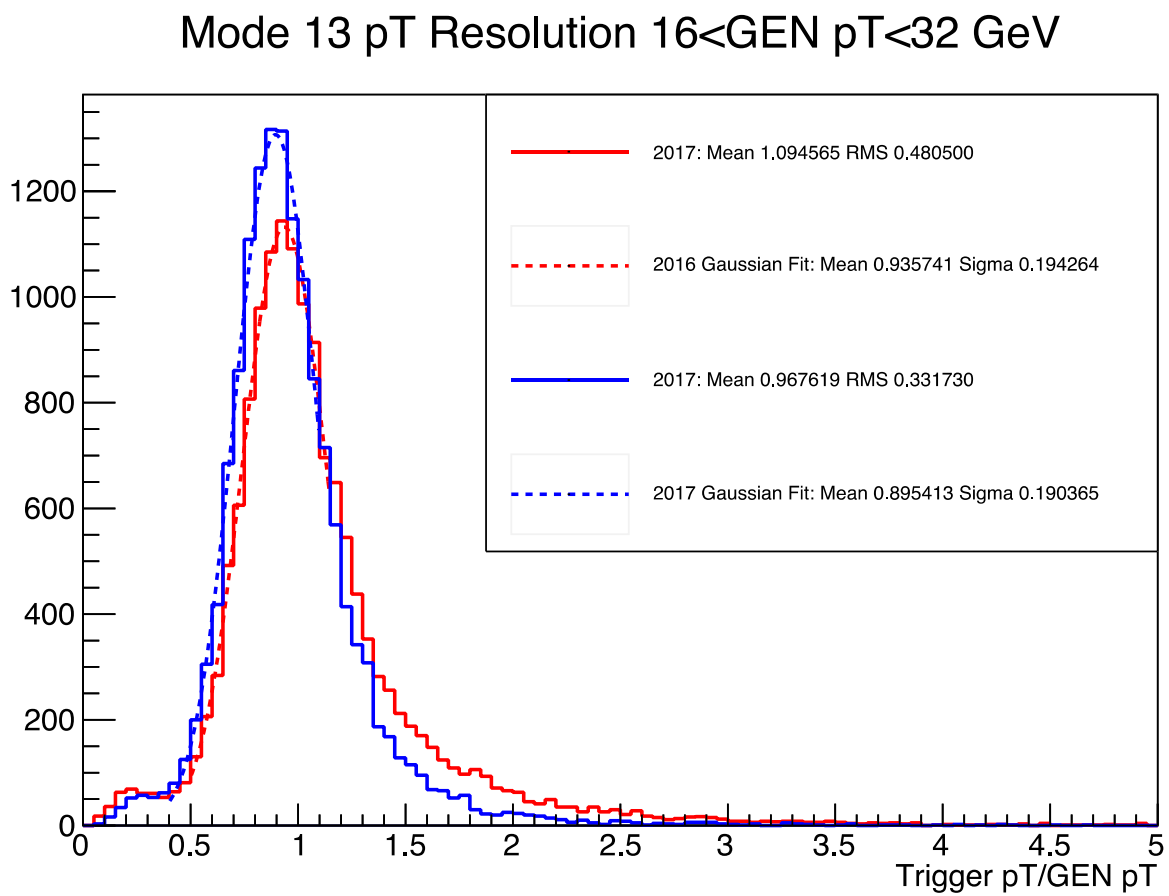
Mode 13 (station 1,2,4)



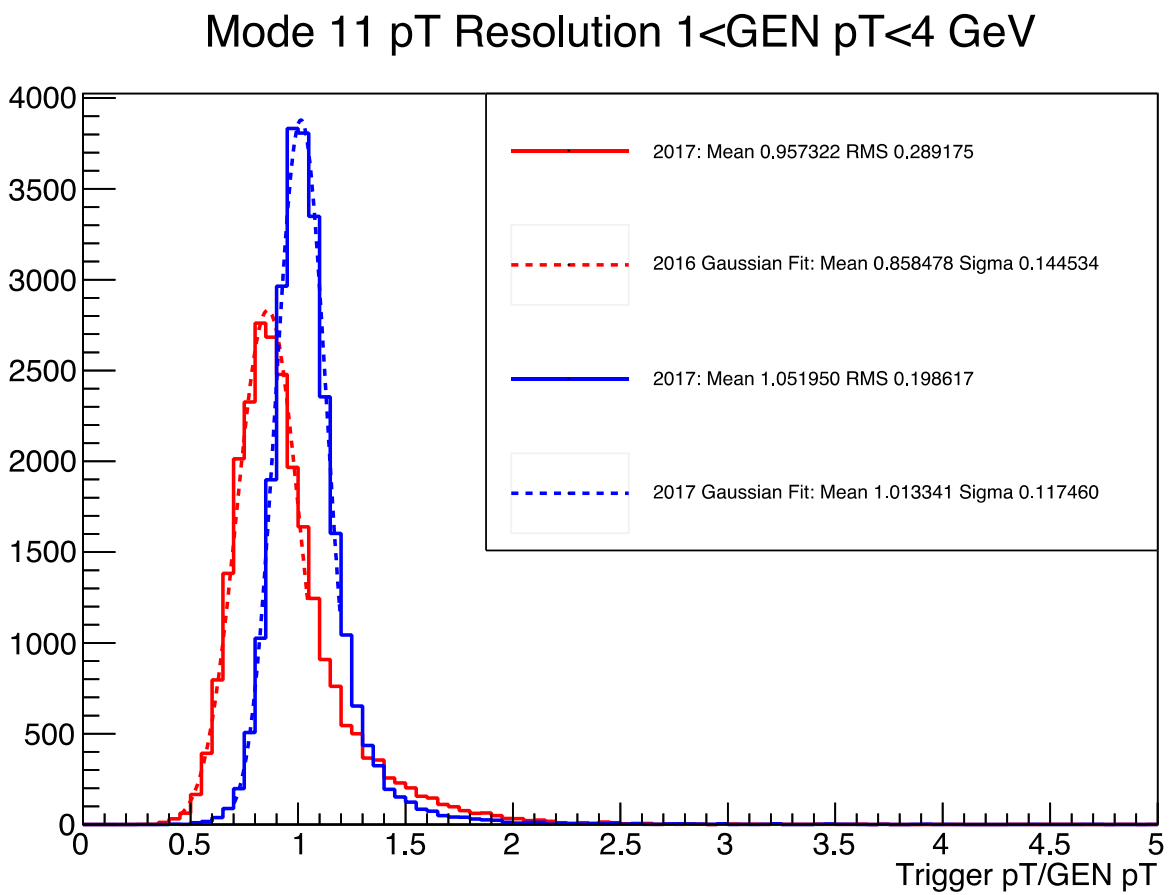
Mode 13 (station 1,2,4)



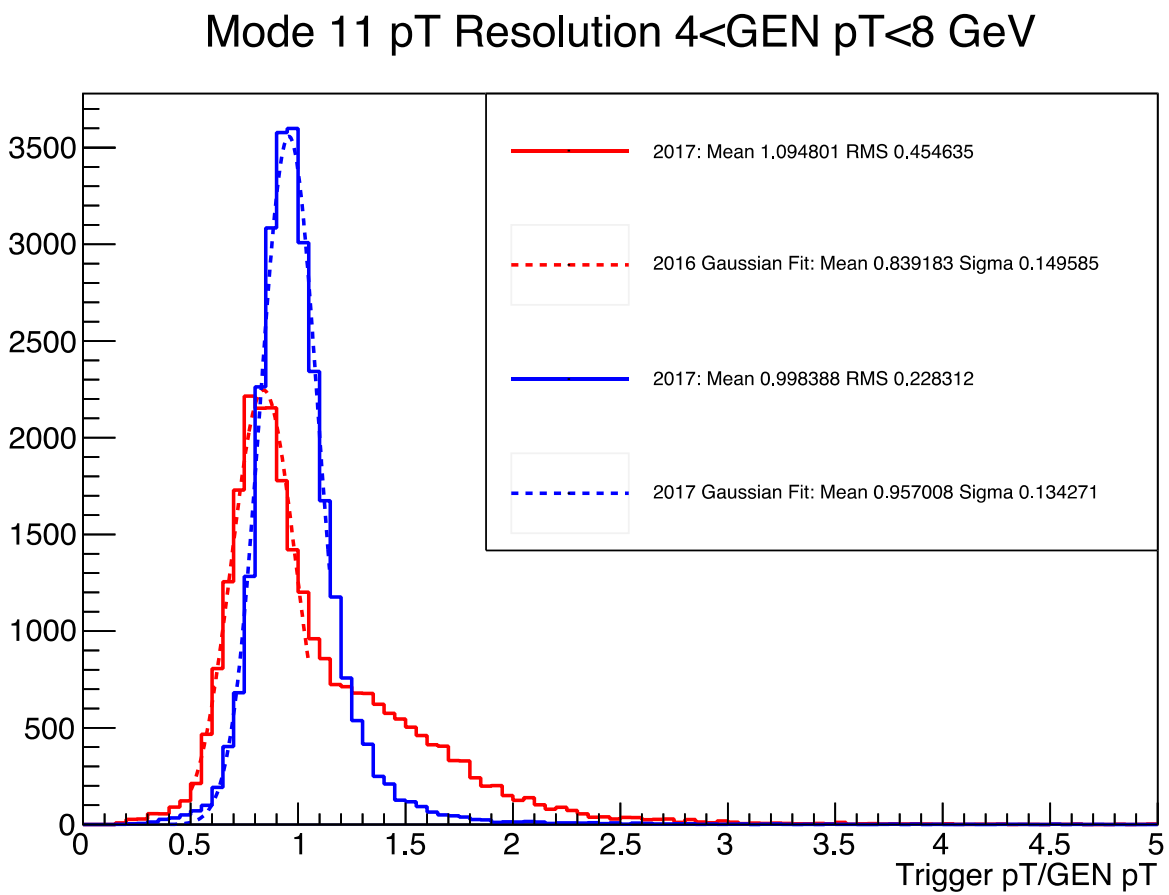
Mode 13 (station 1,2,4)



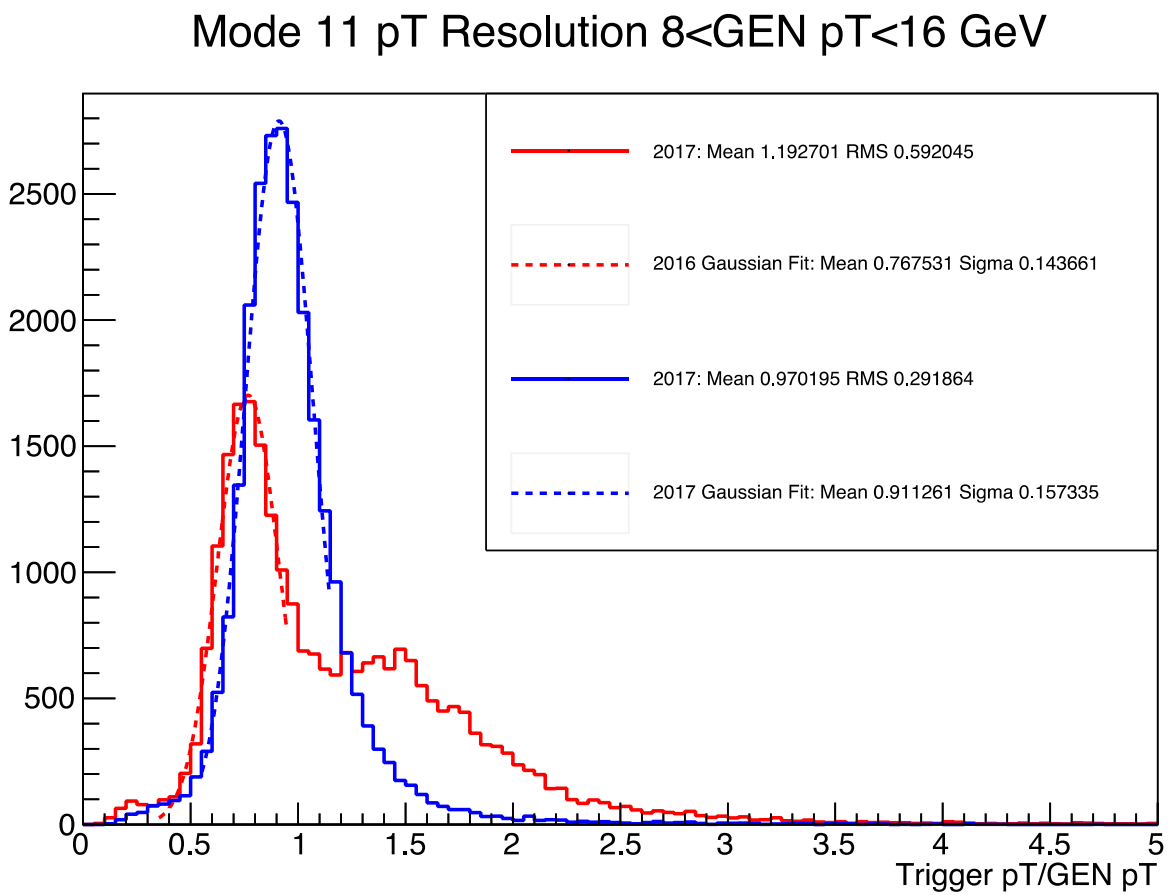
Mode 11 (station 1,3,4)



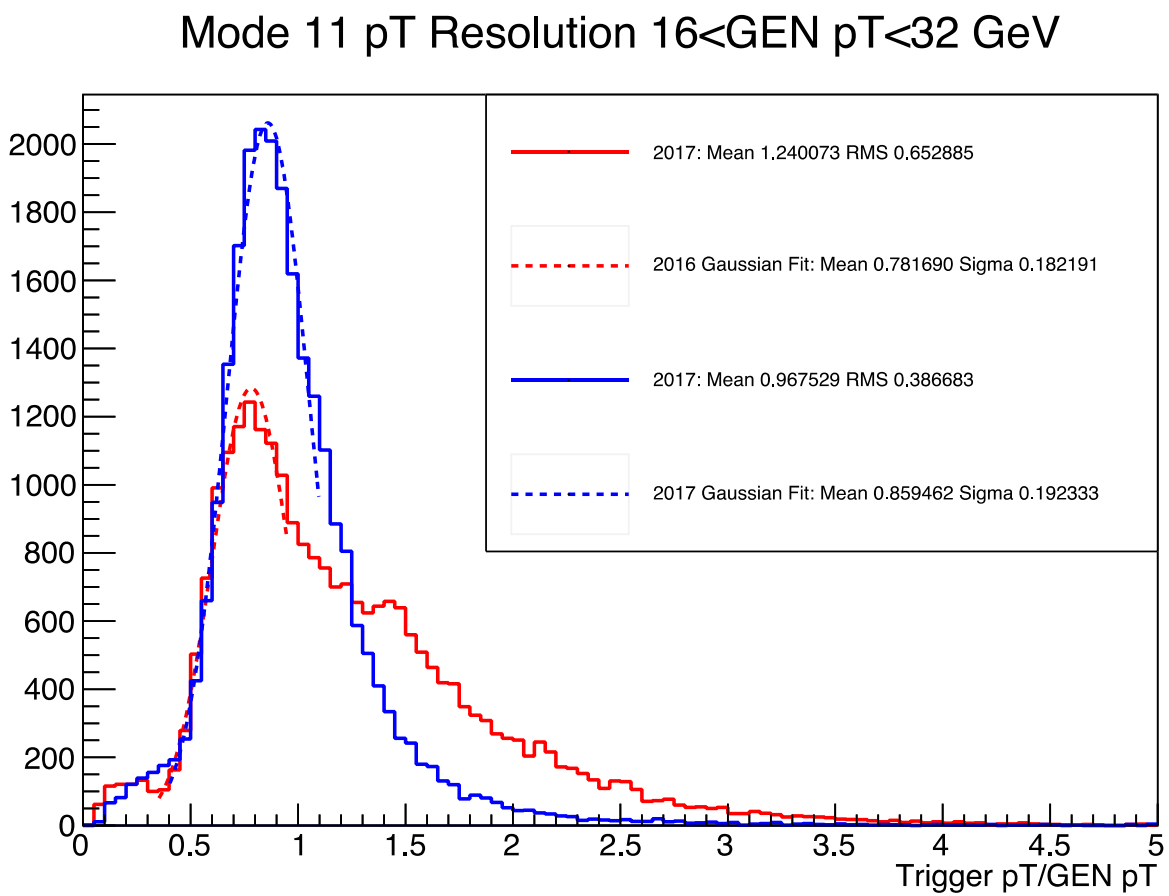
Mode 11 (station 1,3,4)



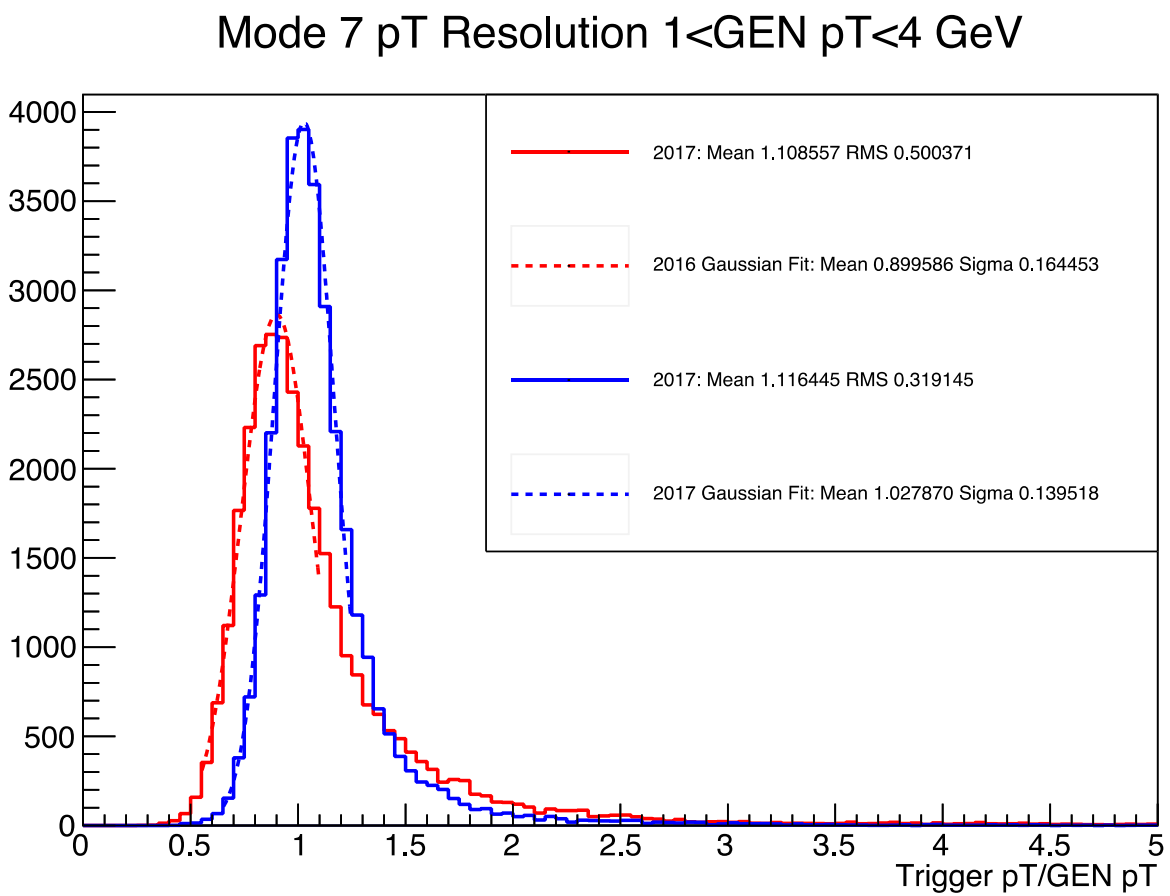
Mode 11 (station 1,3,4)



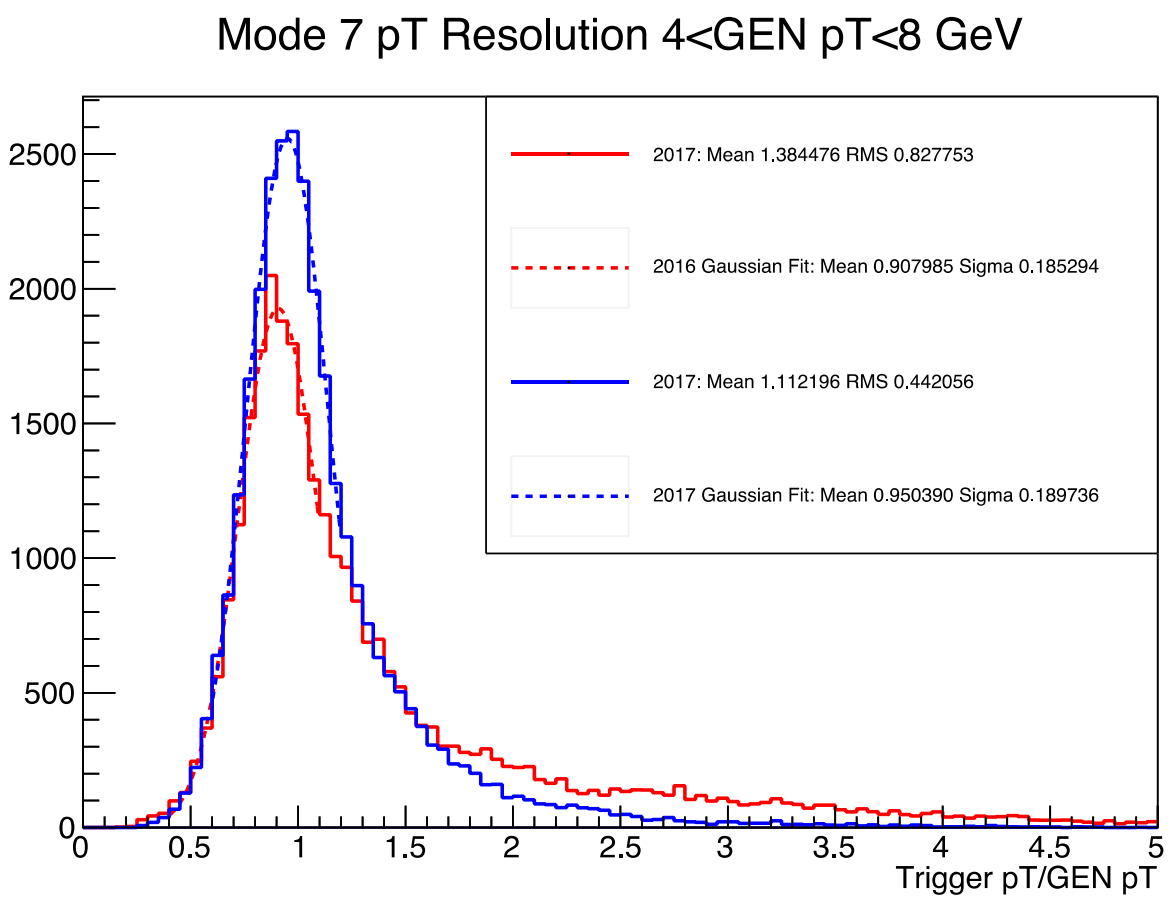
Mode 11 (station 1,3,4)



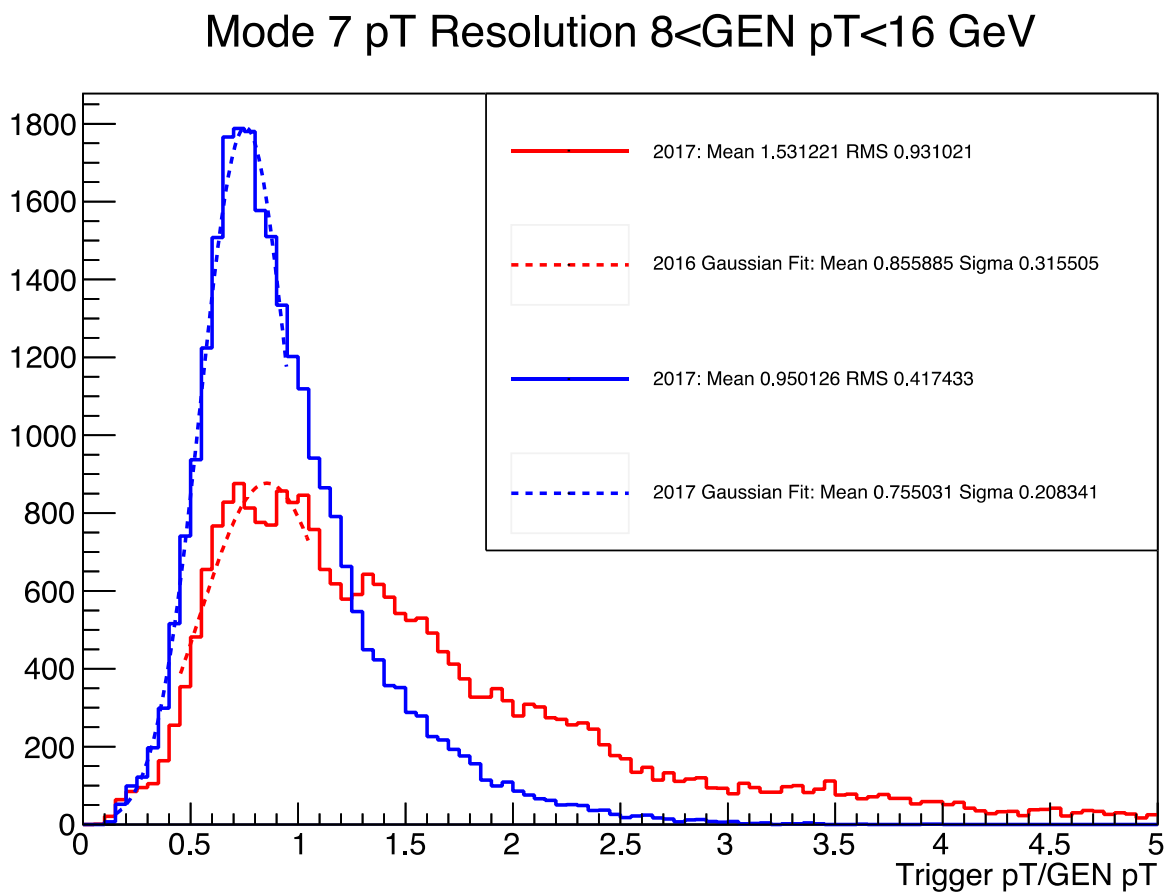
Mode 7 (station 2,3,4)



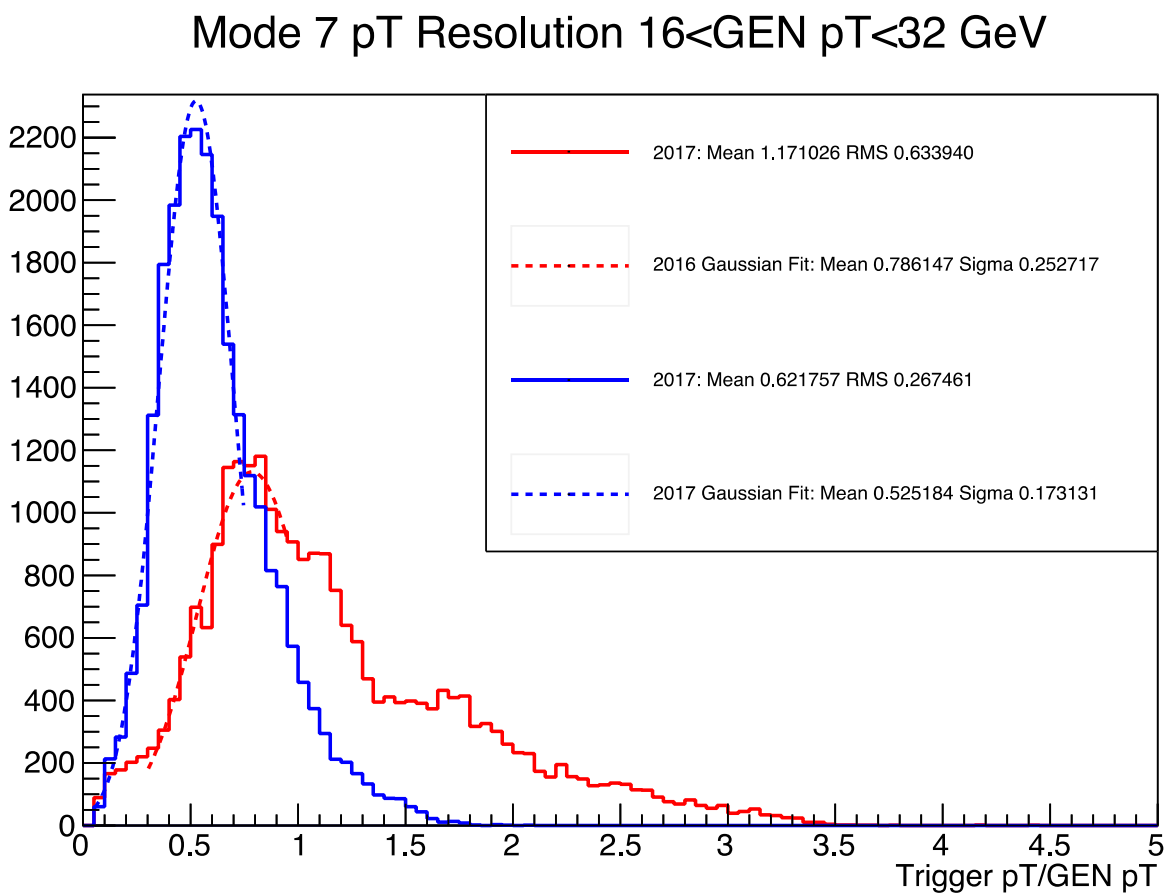
Mode 7 (station 2,3,4)



Mode 7 (station 2,3,4)

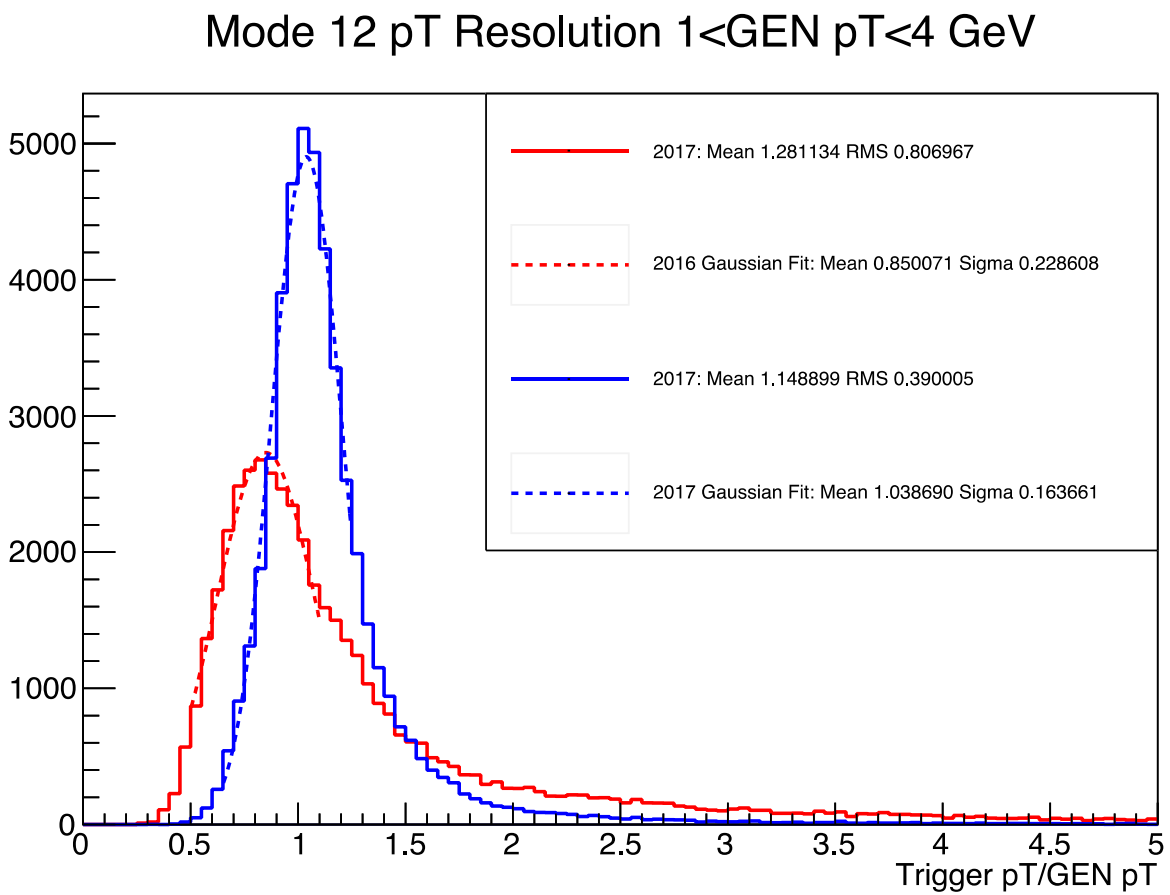


Mode 7 (station 2,3,4)

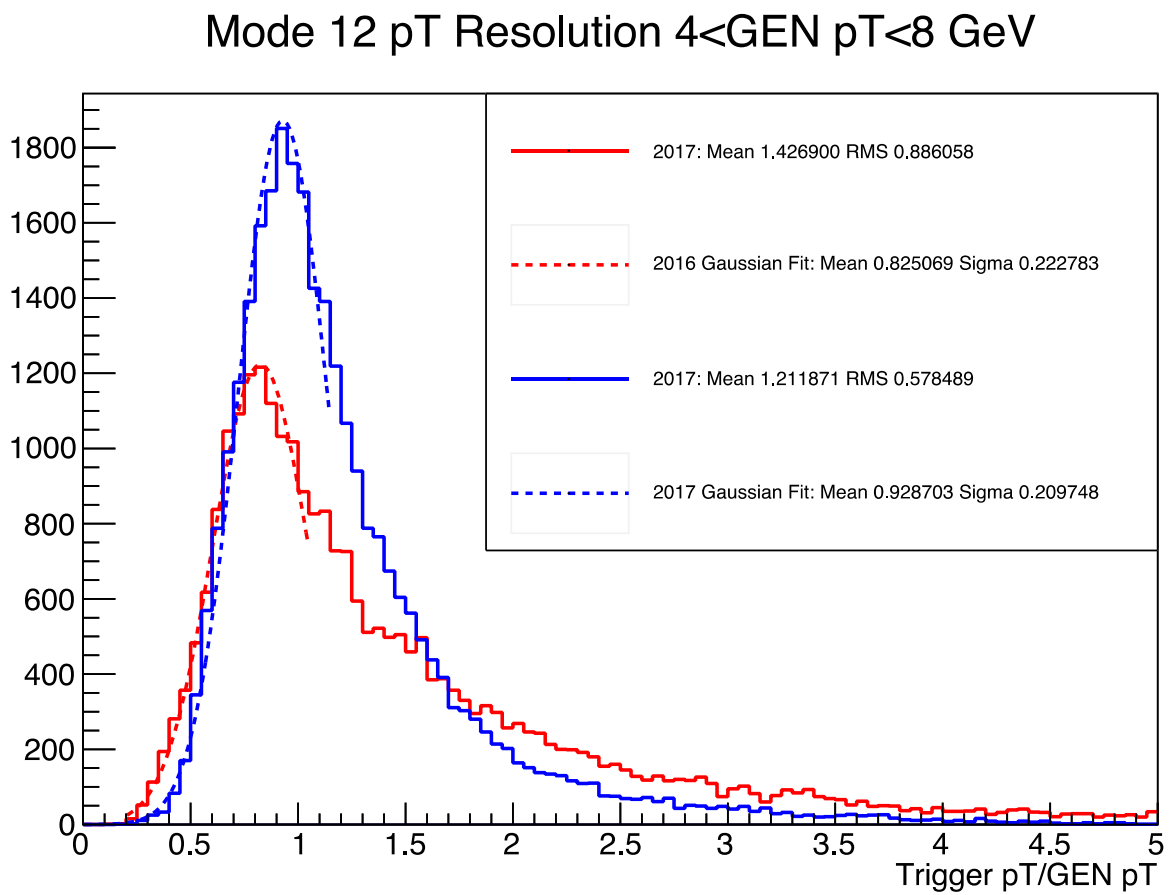


Two station track

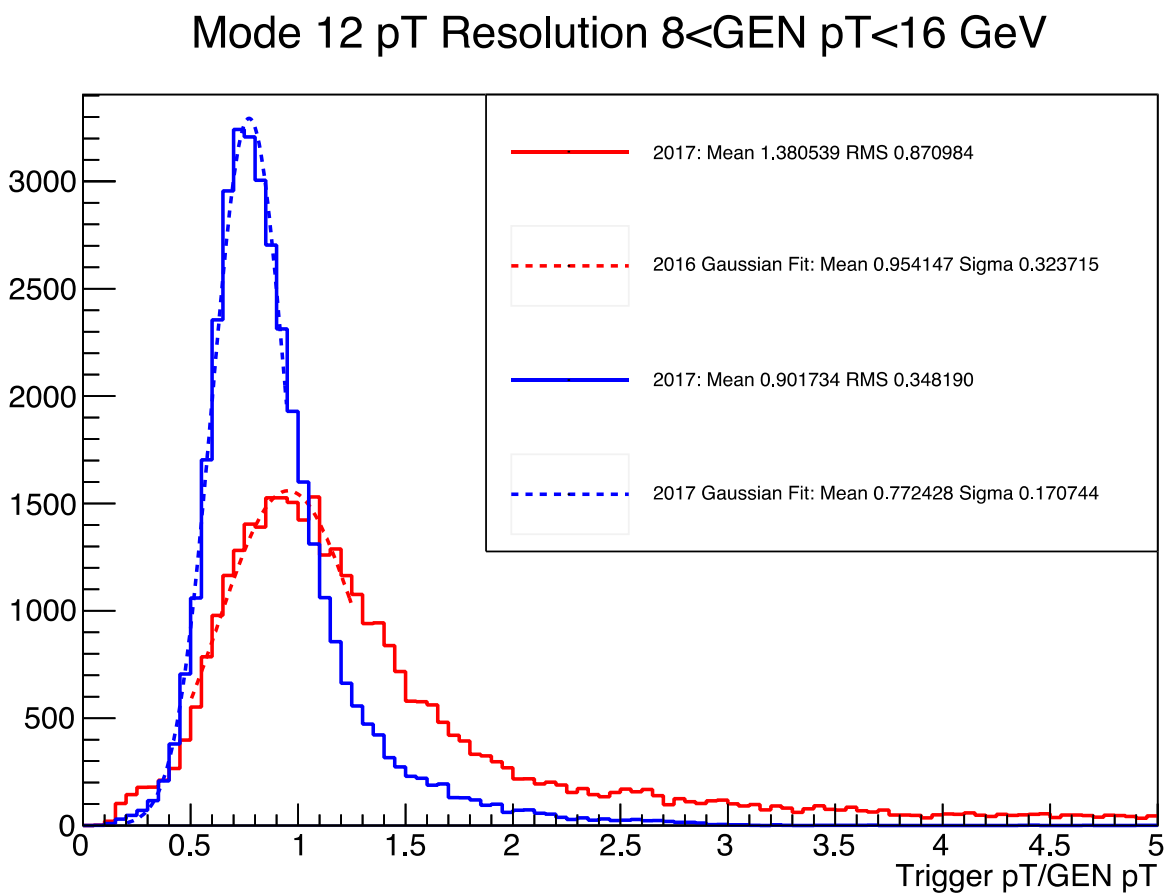
Mode 12 (station 1,2)



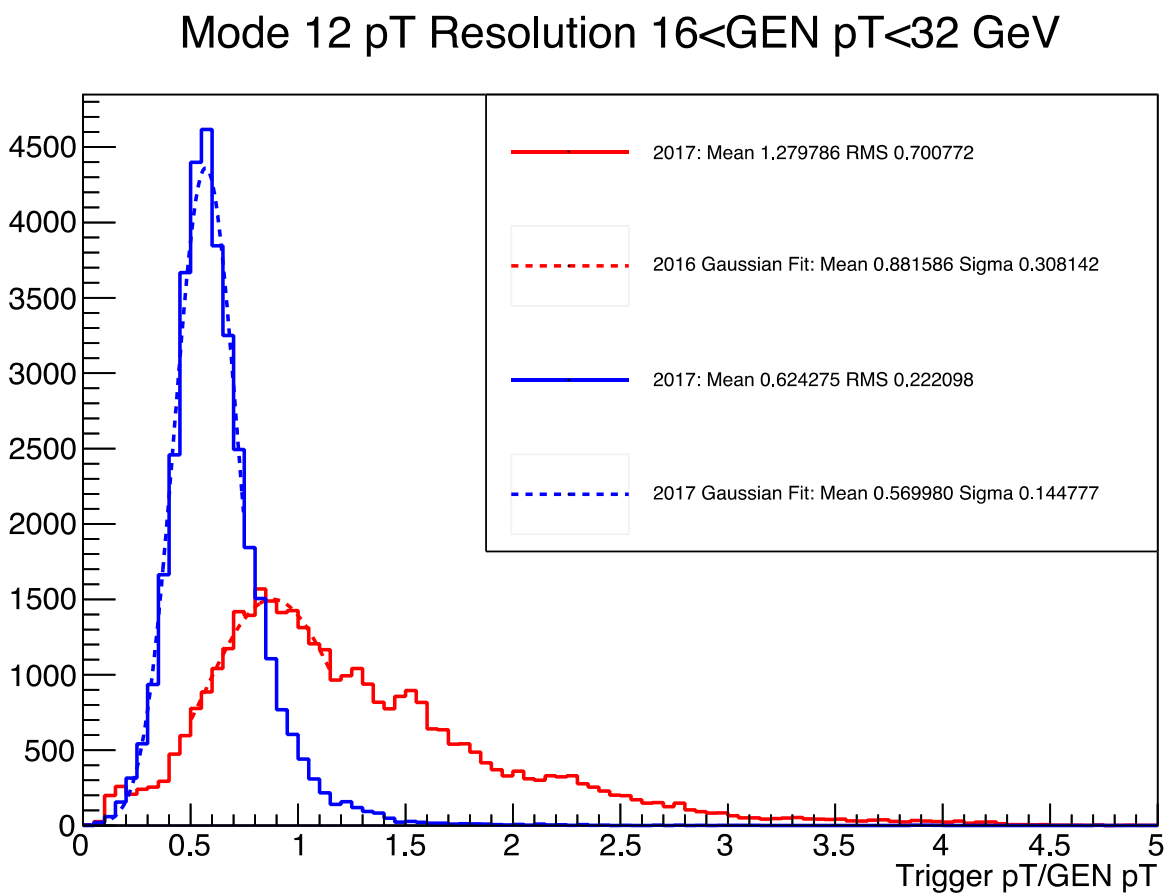
Mode 12 (station 1,2)



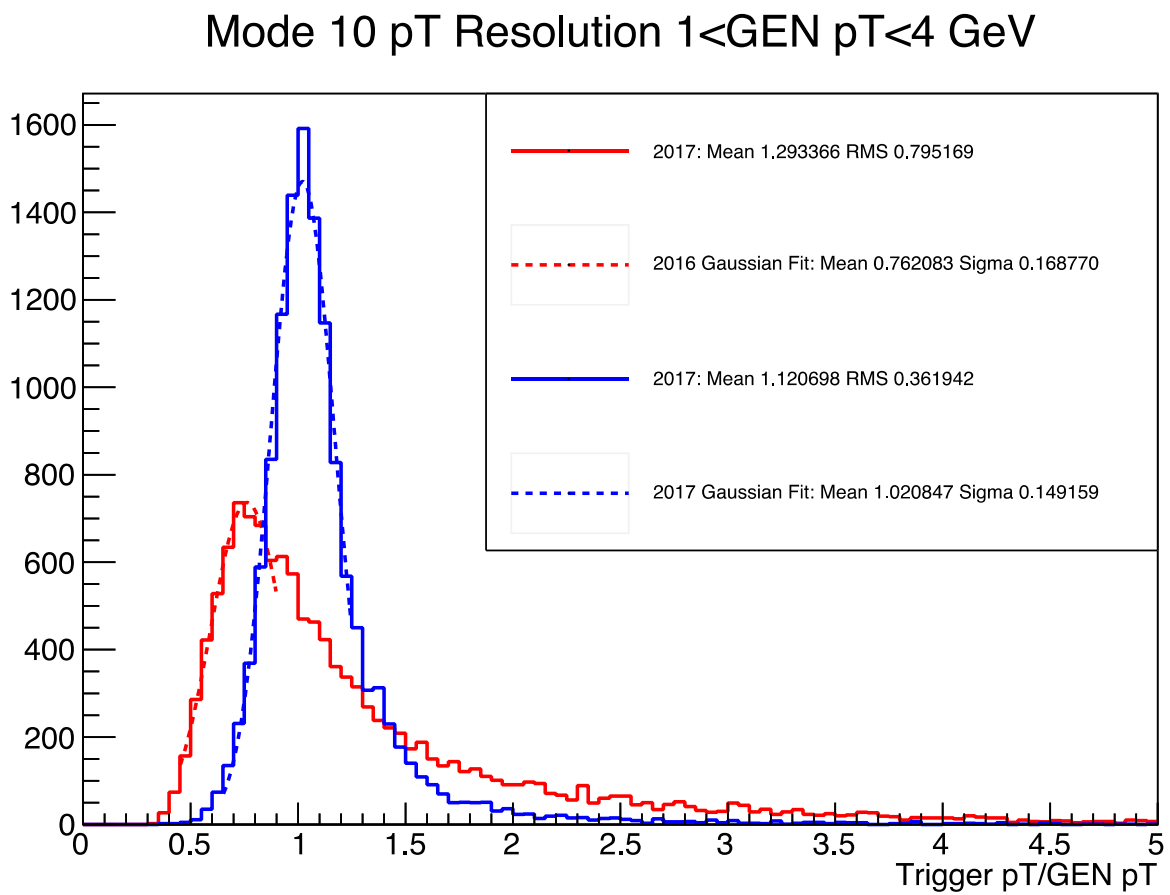
Mode 12 (station 1,2)



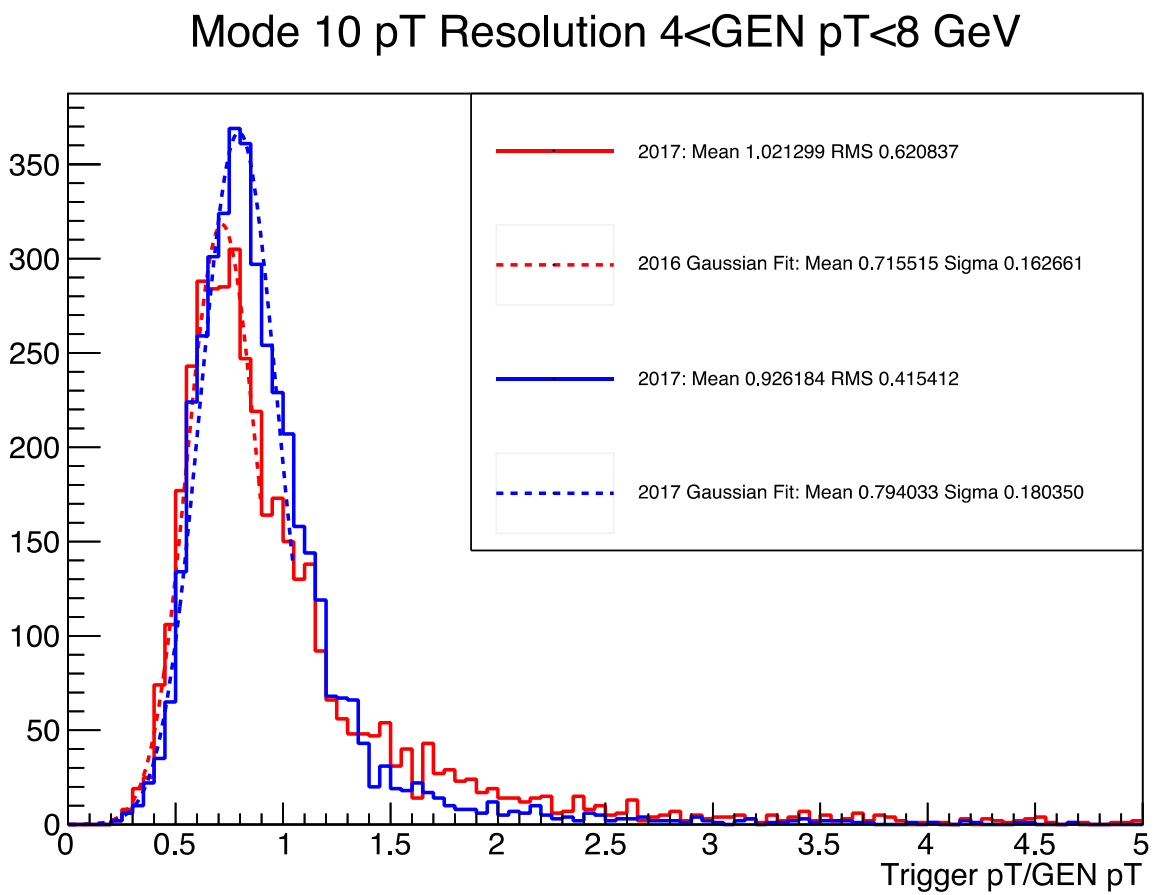
Mode 12 (station 1,2)



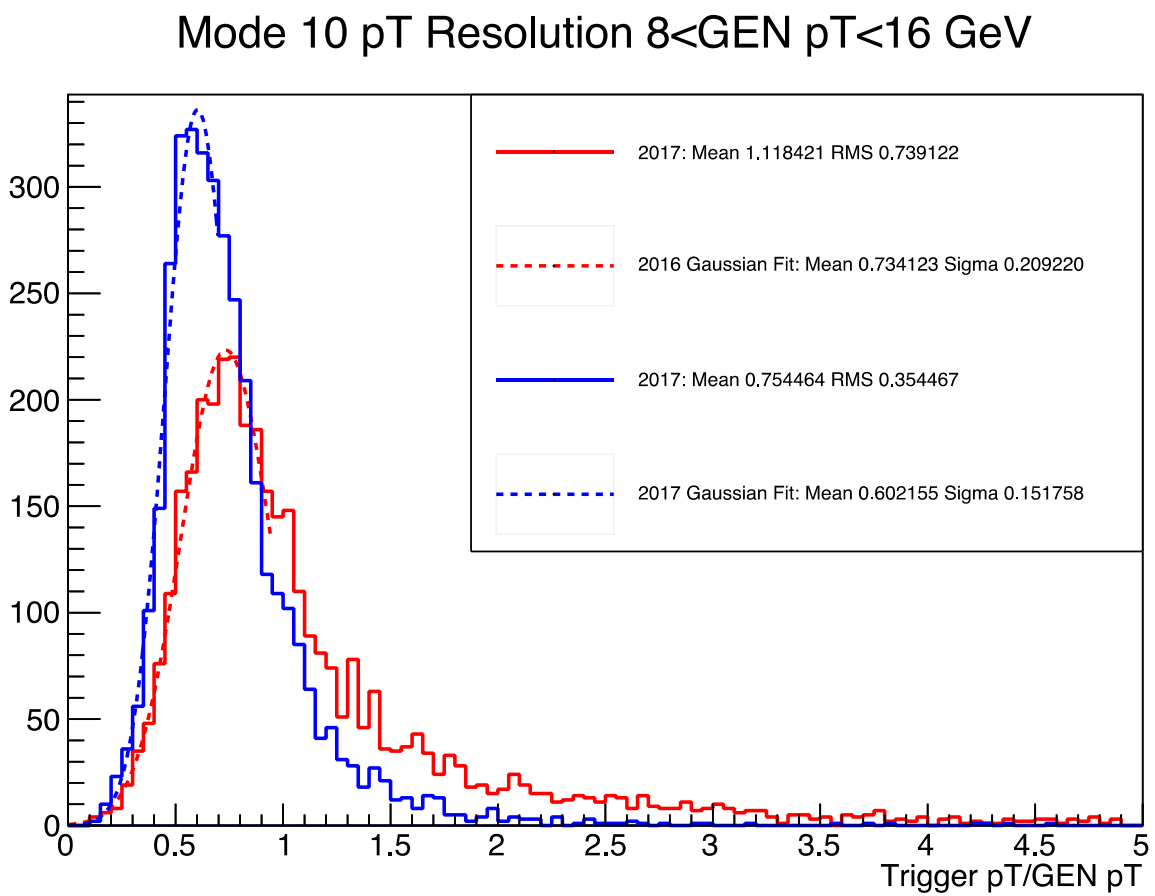
Mode 10 (station 1,3)



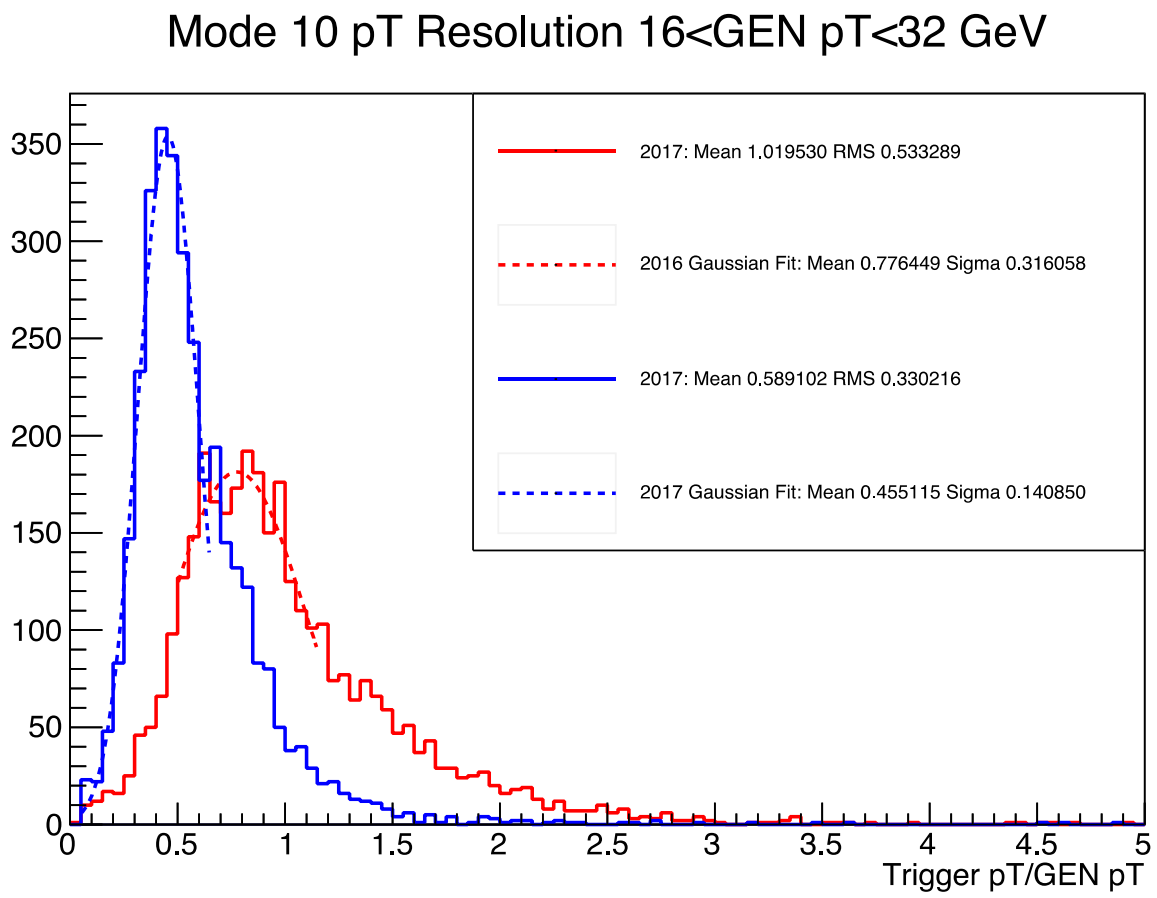
Mode 10 (station 1,3)



Mode 10 (station 1,3)



Mode 10 (station 1,3)



- Other two station track find in back up

Summary Table

Mode 15
===Hist Info==

GEN pT Range[GeV]	2016 Mean	2017 Mean	2016 RMS	2017 RMS	2016 RMS/Mean	2017 RMS/Mean
(1, 4]	0.949	1.04	0.247	0.191	0.26	0.184
(4, 8]	0.997	0.995	0.35	0.207	0.351	0.208
(8, 16]	1.05	0.977	0.47	0.259	0.446	0.265
(16, 32]	1.11	0.963	0.545	0.316	0.492	0.328

===Fit Info==

GEN pT Range[GeV]	2016 Mean	2017 Mean	2016 Sigma	2017 Sigma	2016 Sigma/Mean	2017 Sigma/Mean
(1, 4]	0.897	1	0.141	0.118	0.157	0.118
(4, 8]	0.891	0.955	0.14	0.128	0.157	0.134
(8, 16]	0.894	0.921	0.179	0.156	0.2	0.169
(16, 32]	0.876	0.883	0.166	0.185	0.189	0.209

- Summary table
  - Histogram information: mean, RMS, RMS/mean (2016 and 2017)
  - Gaussian Fit parameter: mean, sigma, sigma/mean (2016 and 2017)

Summary Table

Mode 14
===Hist Info==

GEN pT Range[GeV]	2016 Mean	2017 Mean	2016 RMS	2017 RMS	2016 RMS/Mean	2017 RMS/Mean
(1, 4]	0.856	1.03	0.245	0.2	0.287	0.193
(4, 8]	0.961	0.988	0.364	0.251	0.379	0.254
(8, 16]	1.03	0.959	0.47	0.313	0.454	0.326
(16, 32]	1.08	0.929	0.497	0.36	0.462	0.387

===Fit Info==

GEN pT Range[GeV]	2016 Mean	2017 Mean	2016 Sigma	2017 Sigma	2016 Sigma/Mean	2017 Sigma/Mean
(1, 4]	0.81	1	0.152	0.121	0.187	0.12
(4, 8]	0.883	0.948	0.171	0.13	0.193	0.137
(8, 16]	0.905	0.905	0.183	0.171	0.202	0.189
(16, 32]	0.919	0.851	0.208	0.219	0.226	0.257

Summary Table

Mode 13
===Hist Info==

GEN pT Range[GeV]	2016 Mean	2017 Mean	2016 RMS	2017 RMS	2016 RMS/Mean	2017 RMS/Mean
(1, 4]	0.91	1.04	0.245	0.19	0.269	0.183
(4, 8]	0.964	0.992	0.321	0.218	0.333	0.22
(8, 16]	1.01	0.969	0.406	0.252	0.401	0.26
(16, 32]	1.09	0.968	0.481	0.332	0.439	0.343

===Fit Info==

GEN pT Range[GeV]	2016 Mean	2017 Mean	2016 Sigma	2017 Sigma	2016 Sigma/Mean	2017 Sigma/Mean
(1, 4]	0.862	1.01	0.149	0.119	0.173	0.118
(4, 8]	0.889	0.959	0.145	0.128	0.163	0.134
(8, 16]	0.904	0.928	0.164	0.152	0.181	0.164
(16, 32]	0.936	0.895	0.194	0.19	0.208	0.213

Summary Table

Mode 11
===Hist Info==

GEN pT Range[GeV]	2016 Mean	2017 Mean	2016 RMS	2017 RMS	2016 RMS/Mean	2017 RMS/Mean
(1, 4]	0.957	1.05	0.289	0.199	0.302	0.189
(4, 8]	1.09	0.998	0.455	0.228	0.415	0.229
(8, 16]	1.19	0.97	0.592	0.292	0.496	0.301
(16, 32]	1.24	0.968	0.653	0.387	0.526	0.4

===Fit Info==

GEN pT Range[GeV]	2016 Mean	2017 Mean	2016 Sigma	2017 Sigma	2016 Sigma/Mean	2017 Sigma/Mean
(1, 4]	0.858	1.01	0.145	0.117	0.168	0.116
(4, 8]	0.839	0.957	0.15	0.134	0.178	0.14
(8, 16]	0.768	0.911	0.144	0.157	0.187	0.173
(16, 32]	0.782	0.859	0.182	0.192	0.233	0.224

Summary Table

Mode 7
===Hist Info==

GEN pT Range[GeV]	2016 Mean	2017 Mean	2016 RMS	2017 RMS	2016 RMS/Mean	2017 RMS/Mean
(1, 4]	1.11	1.12	0.5	0.319	0.451	0.286
(4, 8]	1.38	1.11	0.828	0.442	0.598	0.397
(8, 16]	1.53	0.95	0.931	0.417	0.608	0.439
(16, 32]	1.17	0.622	0.634	0.267	0.541	0.43

===Fit Info==

GEN pT Range[GeV]	2016 Mean	2017 Mean	2016 Sigma	2017 Sigma	2016 Sigma/Mean	2017 Sigma/Mean
(1, 4]	0.9	1.03	0.164	0.14	0.183	0.136
(4, 8]	0.908	0.95	0.185	0.19	0.204	0.2
(8, 16]	0.856	0.755	0.316	0.208	0.369	0.276
(16, 32]	0.786	0.525	0.253	0.173	0.321	0.33

Summary Table

Mode 12
===Hist Info==

GEN pT Range[GeV]	2016 Mean	2017 Mean	2016 RMS	2017 RMS	2016 RMS/Mean	2017 RMS/Mean
(1, 4]	1.28	1.15	0.807	0.39	0.63	0.339
(4, 8]	1.43	1.21	0.886	0.578	0.621	0.477
(8, 16]	1.38	0.902	0.871	0.348	0.631	0.386
(16, 32]	1.28	0.624	0.701	0.222	0.548	0.356

===Fit Info==

GEN pT Range[GeV]	2016 Mean	2017 Mean	2016 Sigma	2017 Sigma	2016 Sigma/Mean	2017 Sigma/Mean
(1, 4]	0.85	1.04	0.229	0.164	0.269	0.158
(4, 8]	0.825	0.929	0.223	0.21	0.27	0.226
(8, 16]	0.954	0.772	0.324	0.171	0.339	0.221
(16, 32]	0.882	0.57	0.308	0.145	0.35	0.254

Summary Table

Mode 10
===Hist Info==

GEN pT Range[GeV]	2016 Mean	2017 Mean	2016 RMS	2017 RMS	2016 RMS/Mean	2017 RMS/Mean
(1, 4]	1.29	1.12	0.795	0.362	0.615	0.323
(4, 8]	1.02	0.926	0.621	0.415	0.608	0.449
(8, 16]	1.12	0.754	0.739	0.354	0.661	0.47
(16, 32]	1.02	0.589	0.533	0.33	0.523	0.561

===Fit Info==

GEN pT Range[GeV]	2016 Mean	2017 Mean	2016 Sigma	2017 Sigma	2016 Sigma/Mean	2017 Sigma/Mean
(1, 4]	0.762	1.02	0.169	0.149	0.221	0.146
(4, 8]	0.716	0.794	0.163	0.18	0.227	0.227
(8, 16]	0.734	0.602	0.209	0.152	0.285	0.252
(16, 32]	0.776	0.455	0.316	0.141	0.407	0.309

- Other two station track summary table find in back up

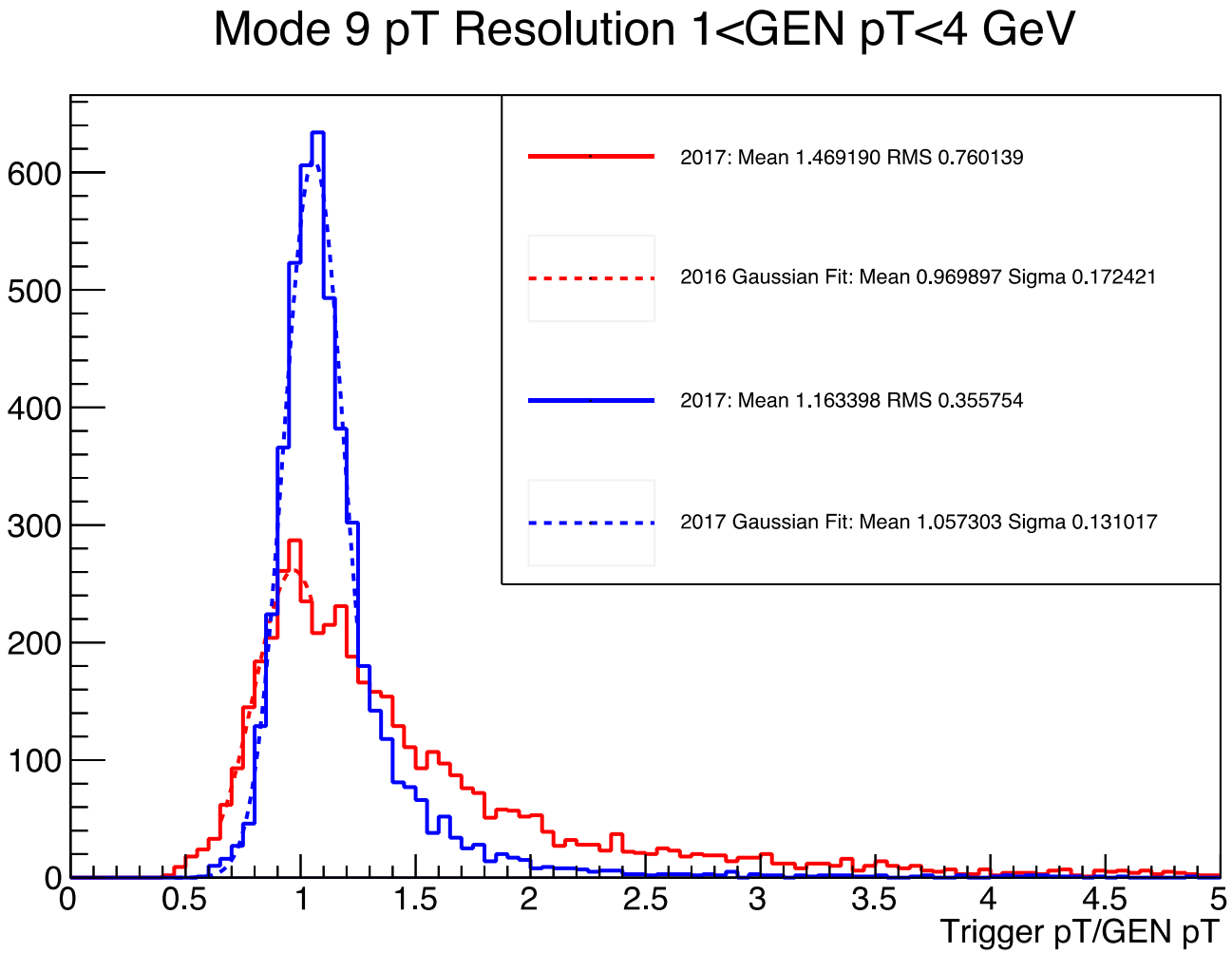
Conclusion

- 2017 EMTF pT resolution is better than 2016 in pT (1, 32] GeV
  - Use fit sigma/mean as the pT resolution evaluation metric
  - 2017 pT resolution is ~2% - 11% better than 2016, depending on modes and pT
  - 2017 pT resolution is between 10% and 20% in pT (1, 32] GeV

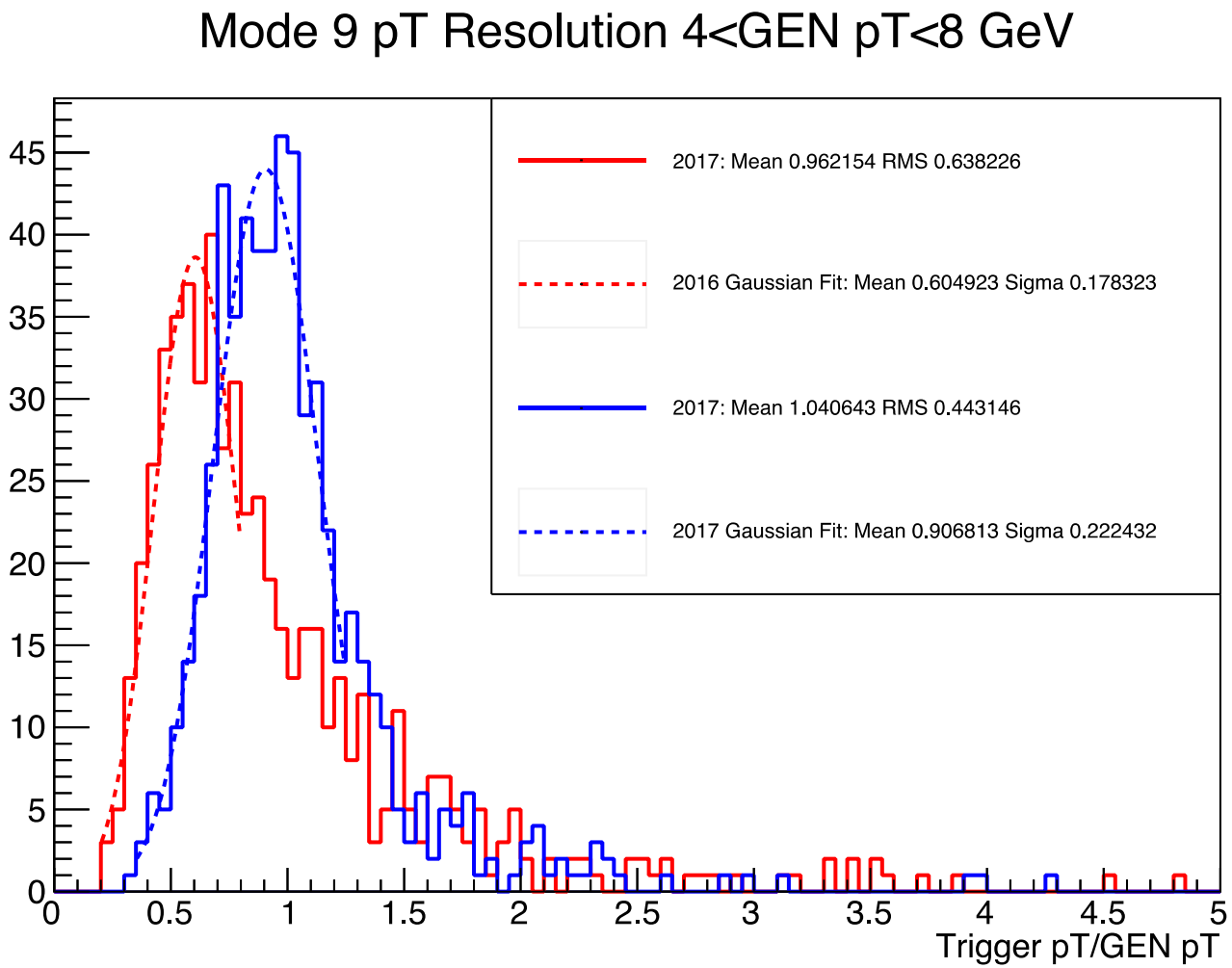
BACK UP

Other two station track

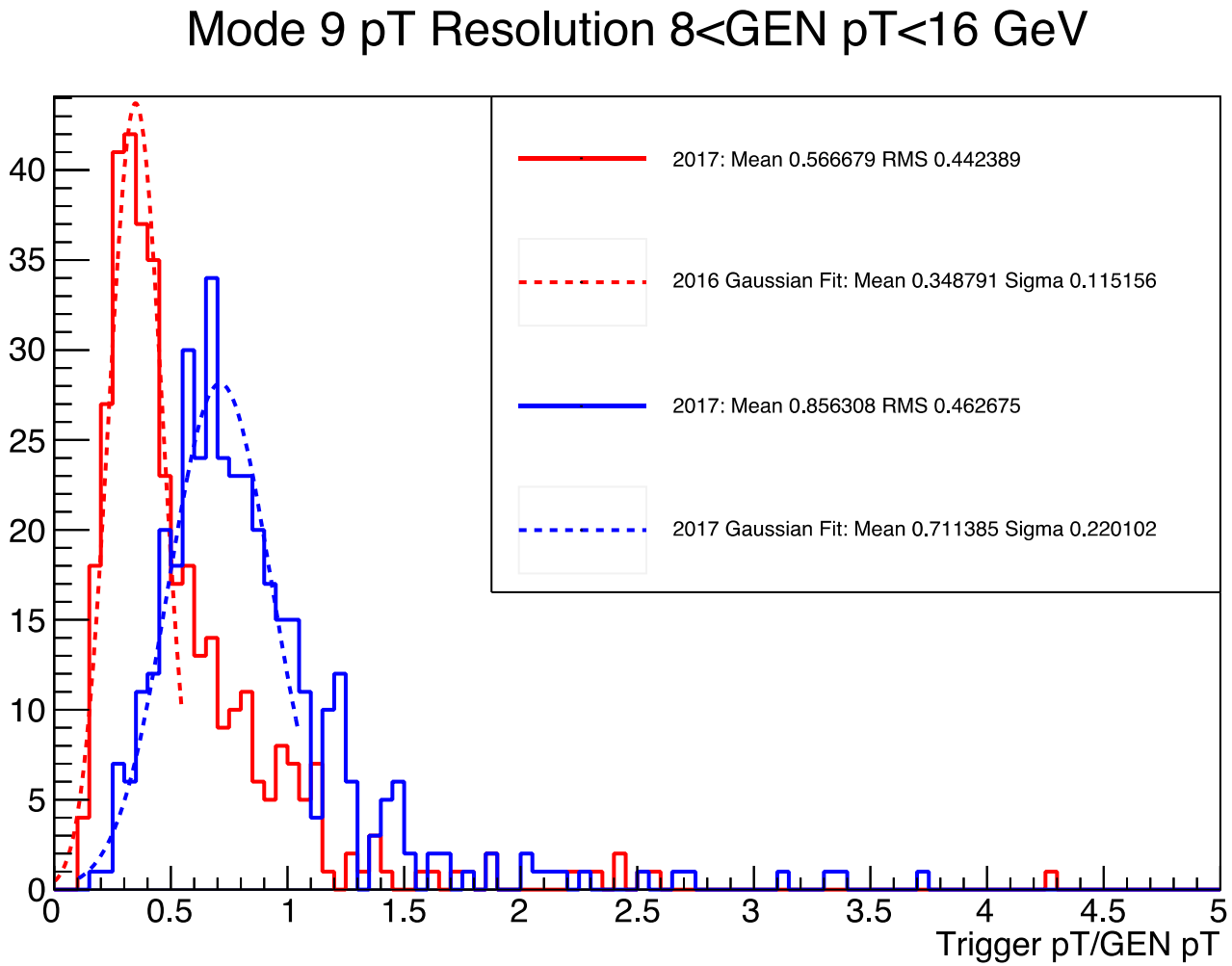
Mode 9 (station 1,4)



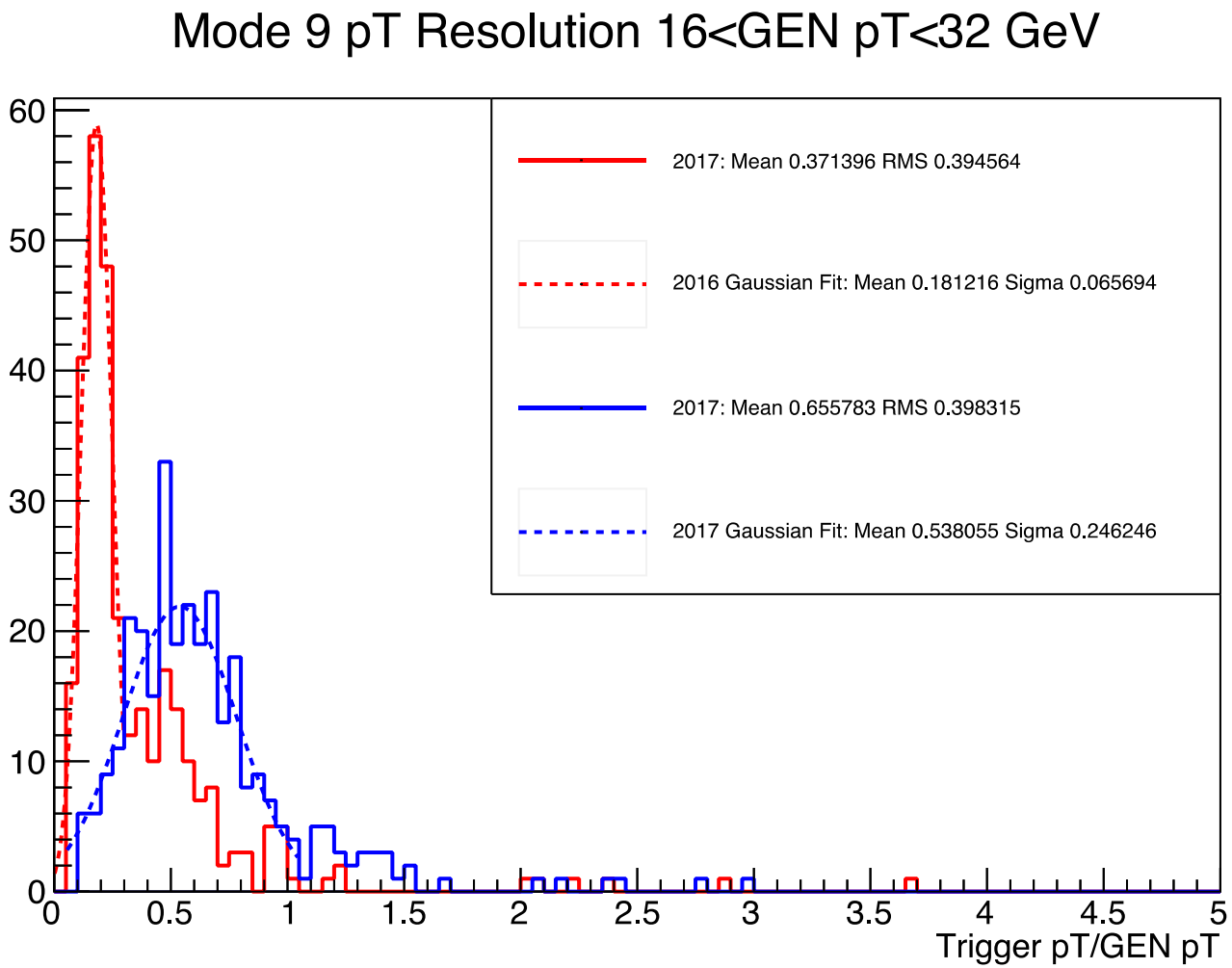
Mode 9 (station 1,4)



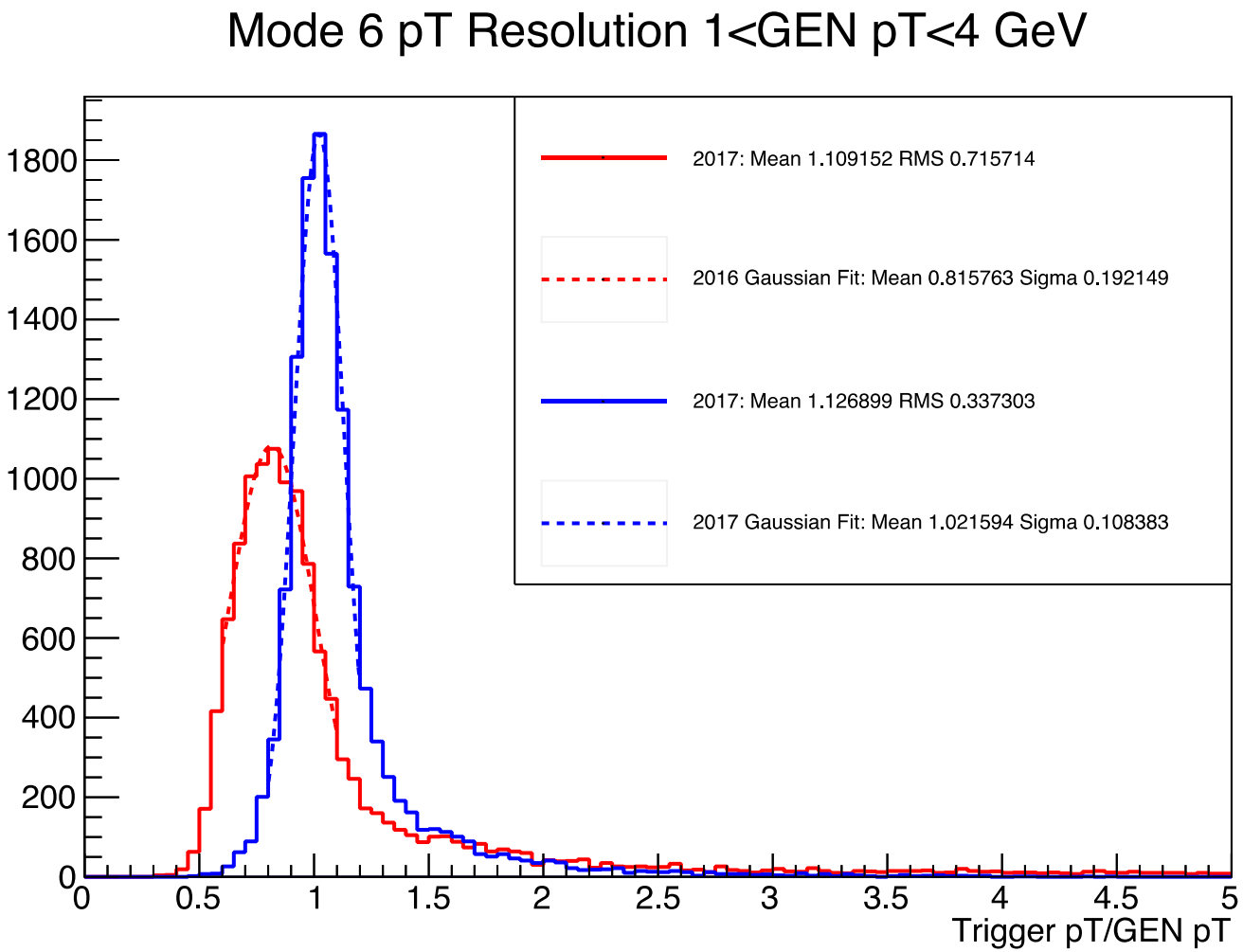
Mode 9 (station 1,4)



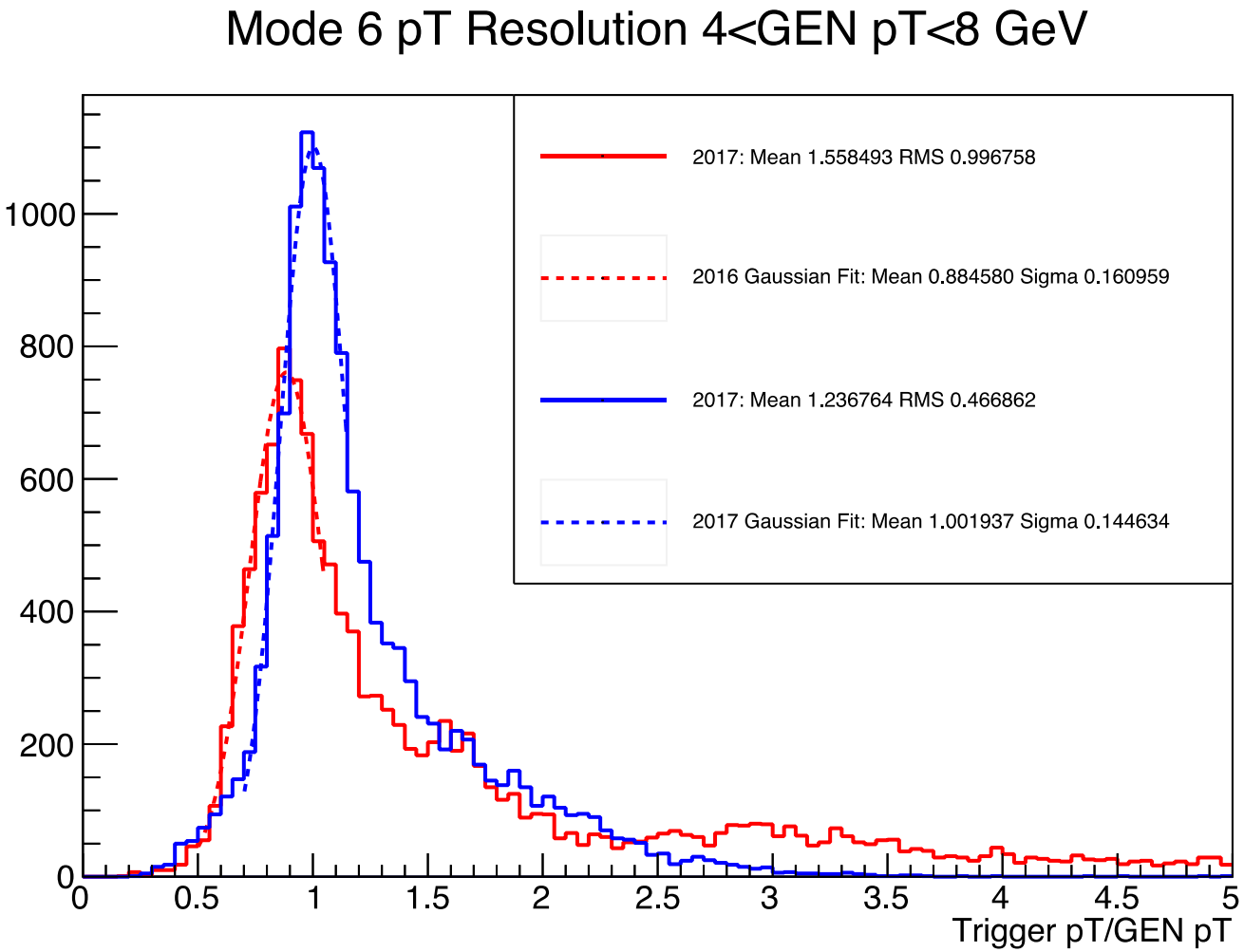
Mode 9 (station 1,4)



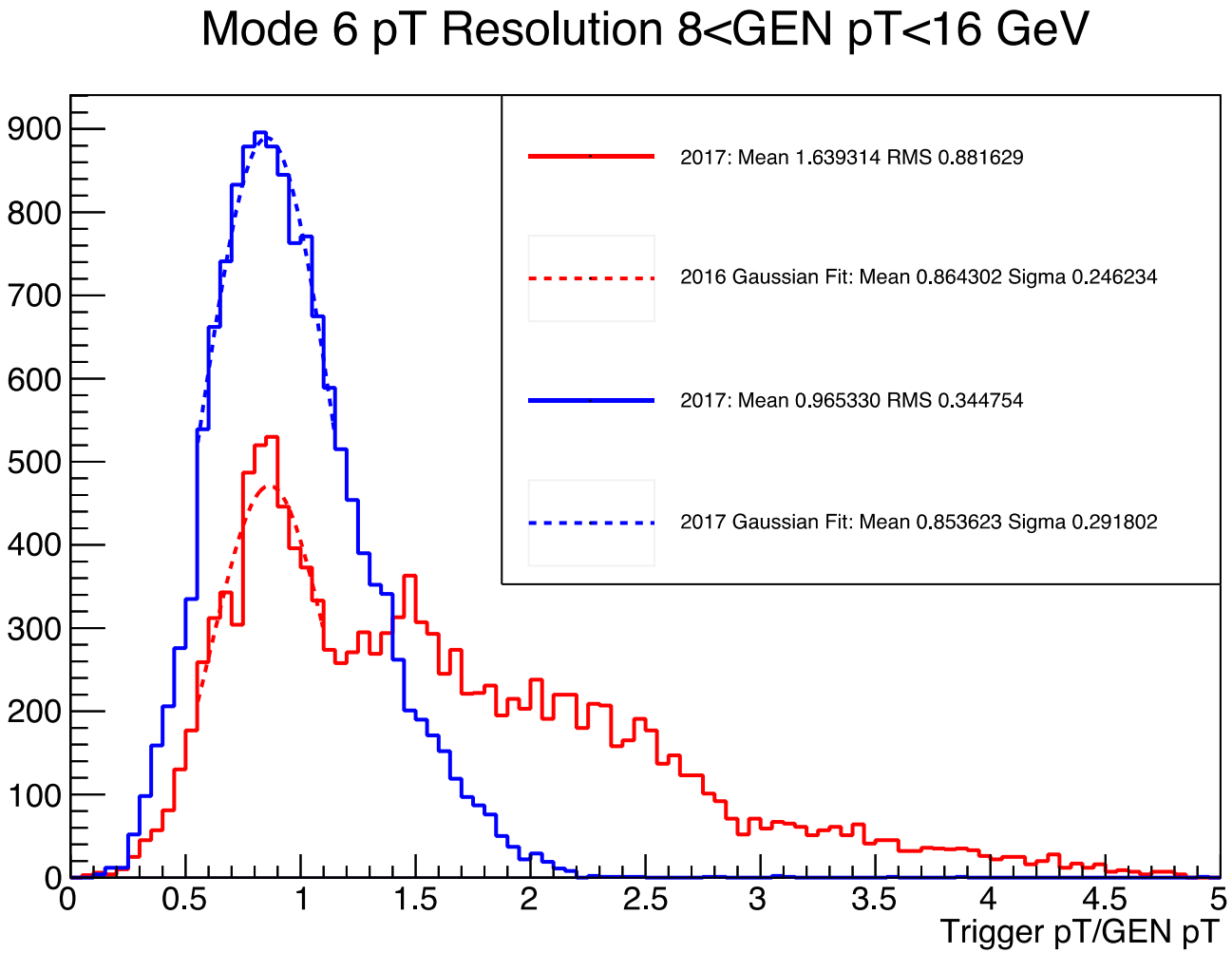
Mode 6 (station 2,3)



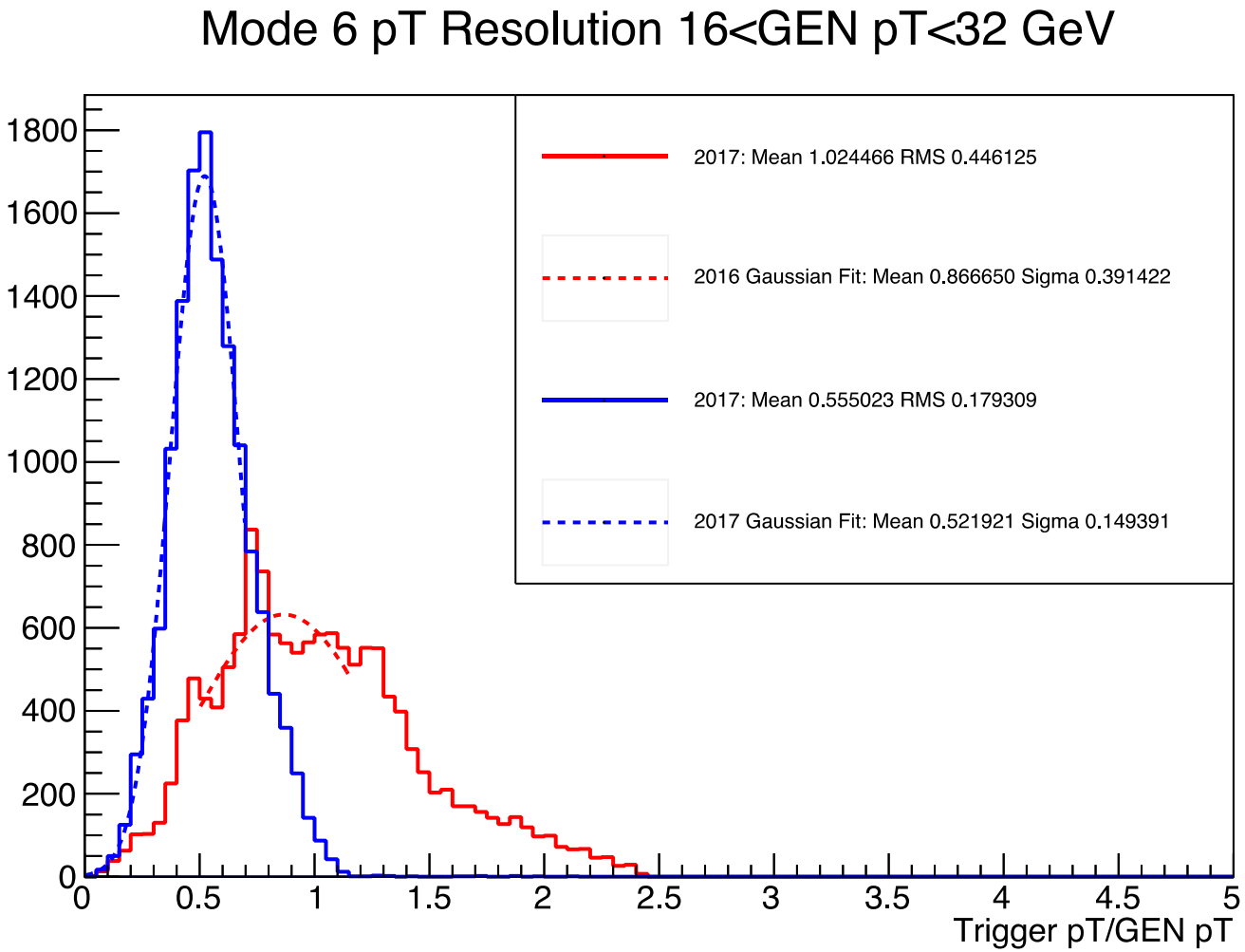
Mode 6 (station 2,3)



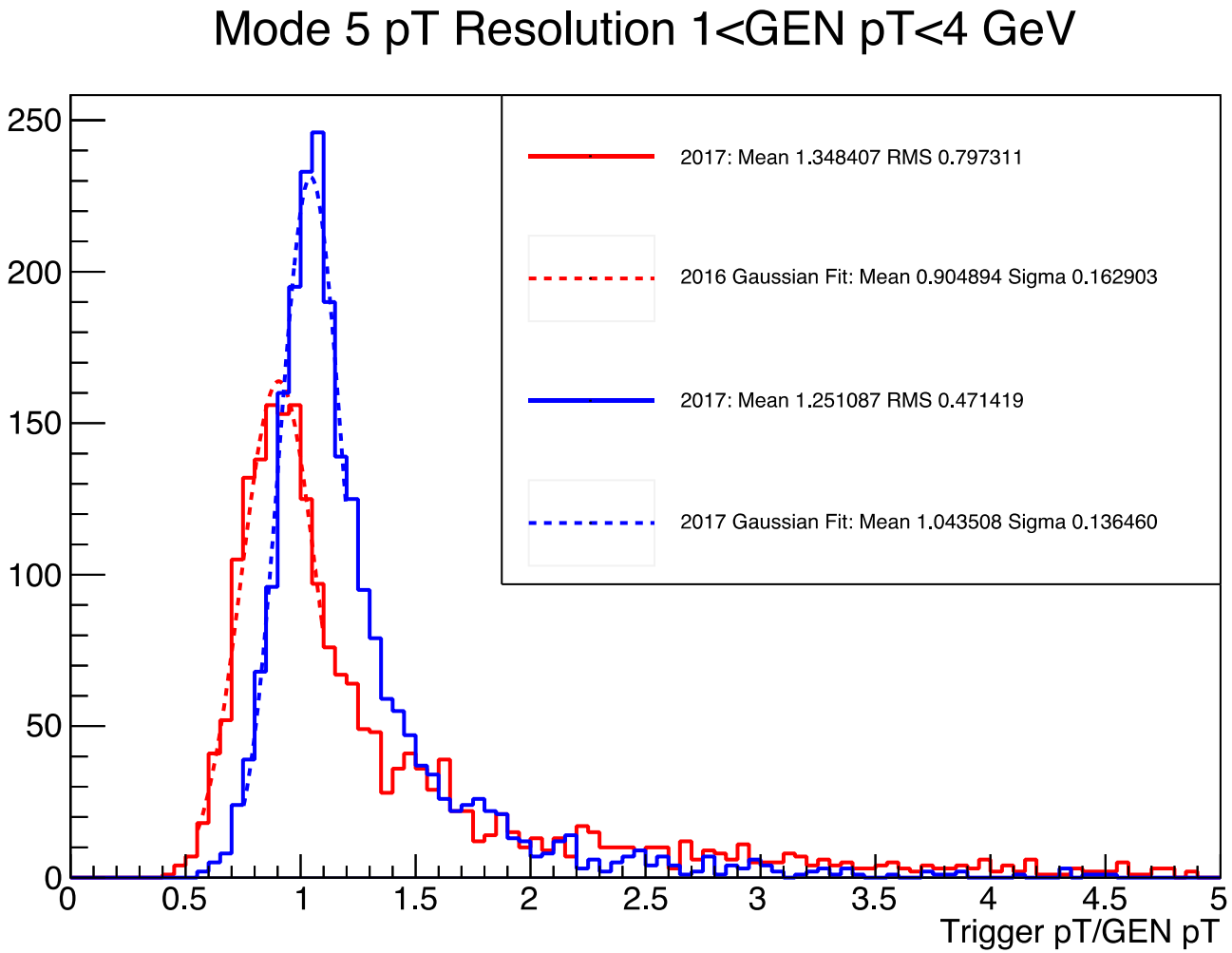
Mode 6 (station 2,3)



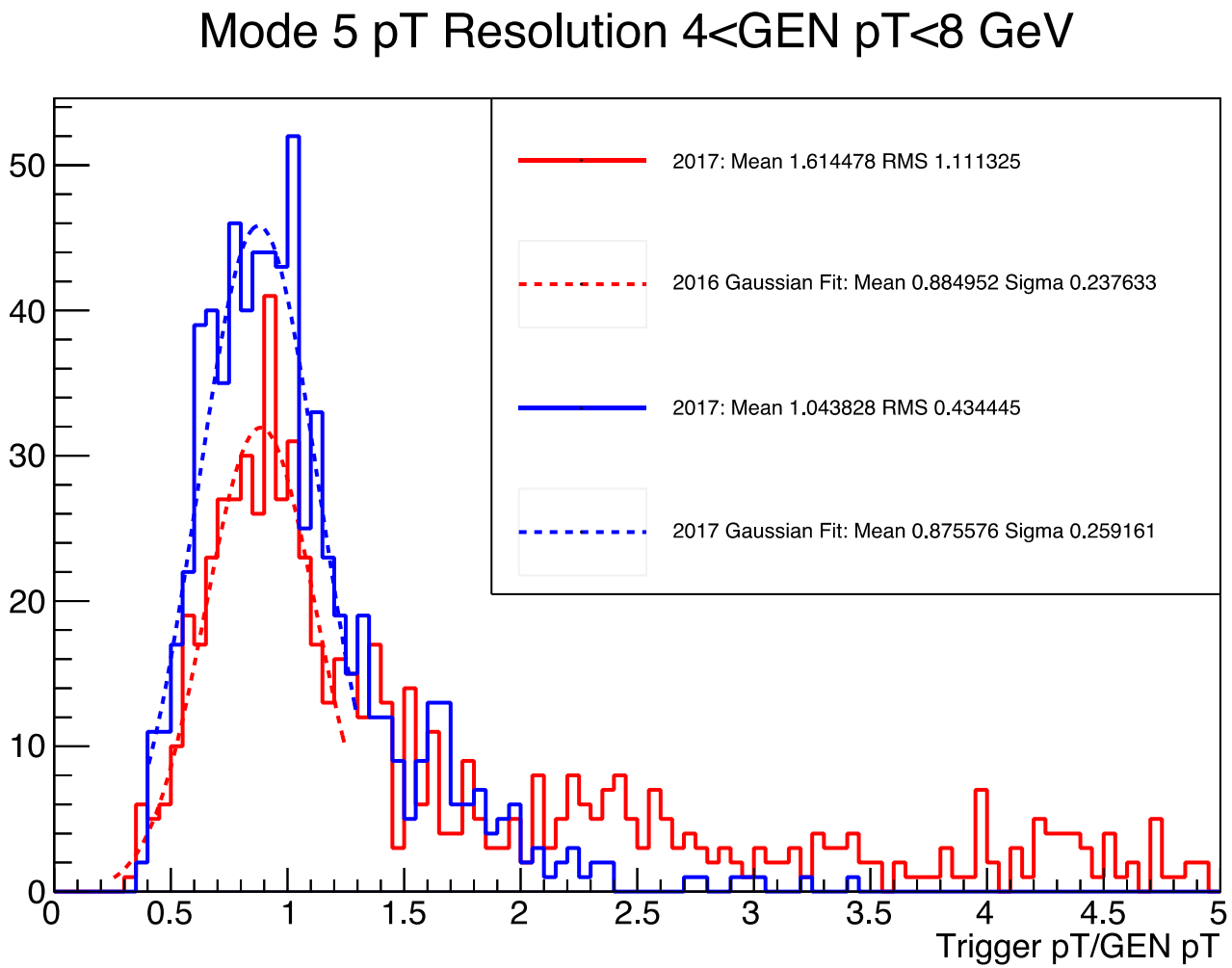
Mode 6 (station 2,3)



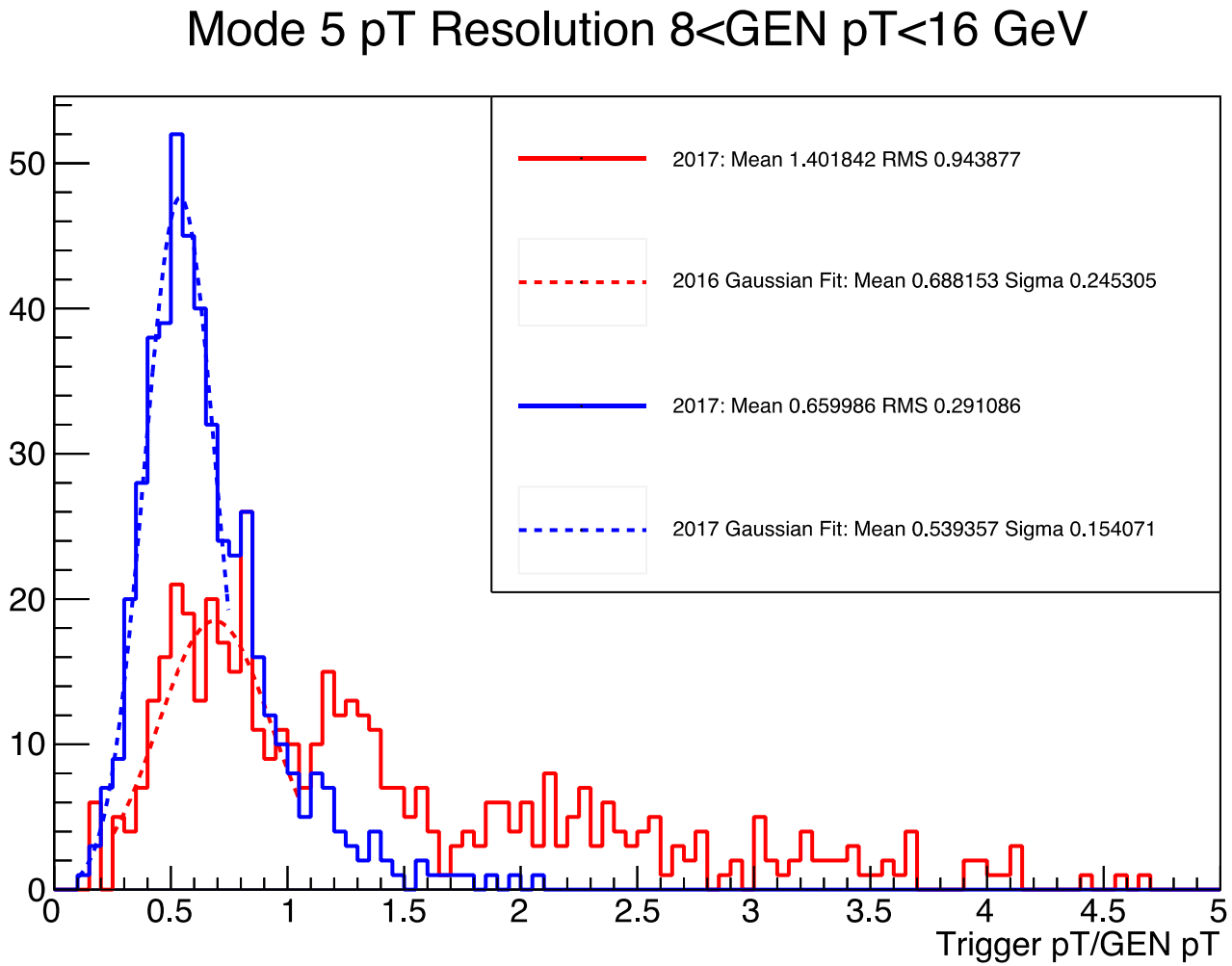
Mode 5 (station 2,4)



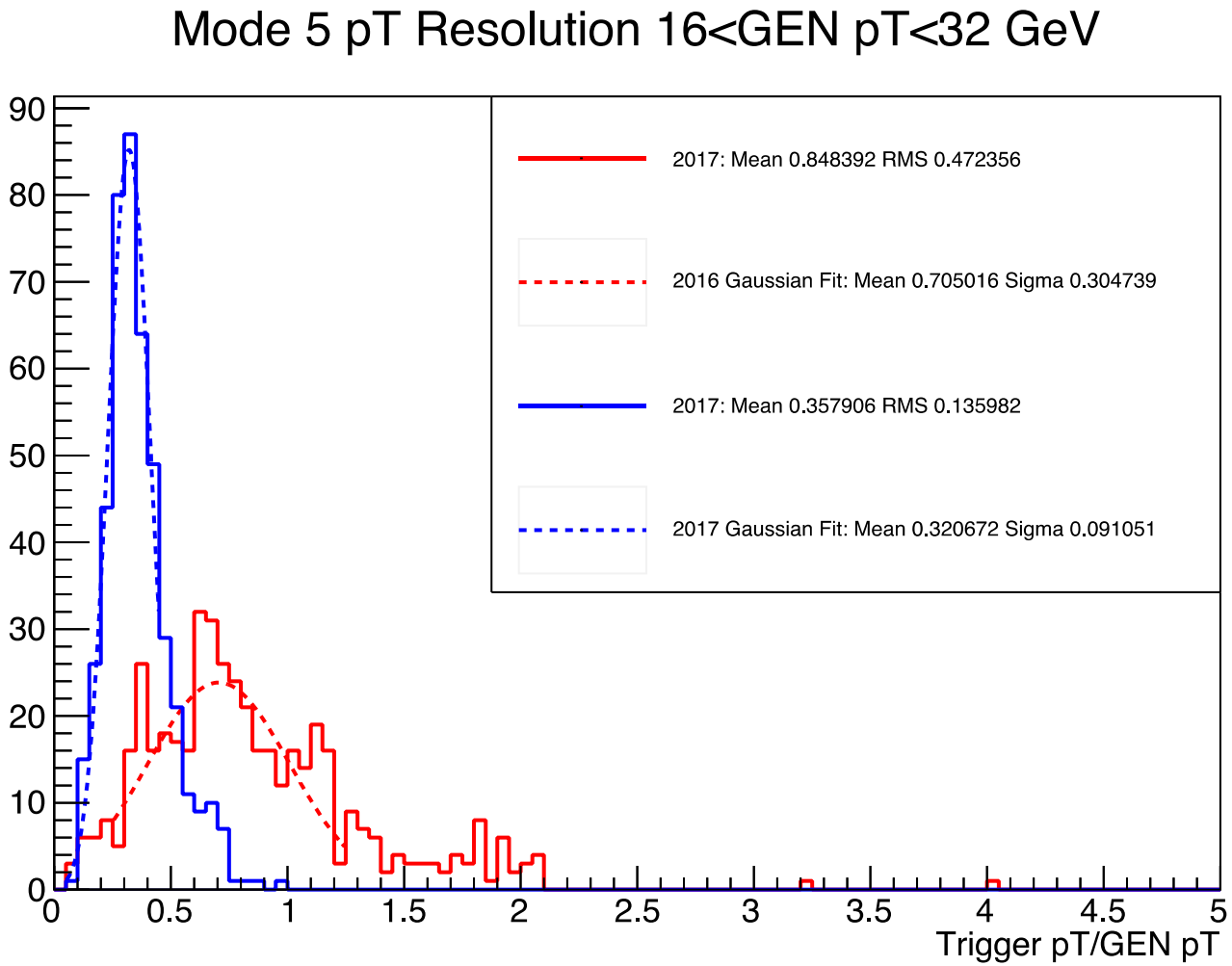
Mode 5 (station 2,4)



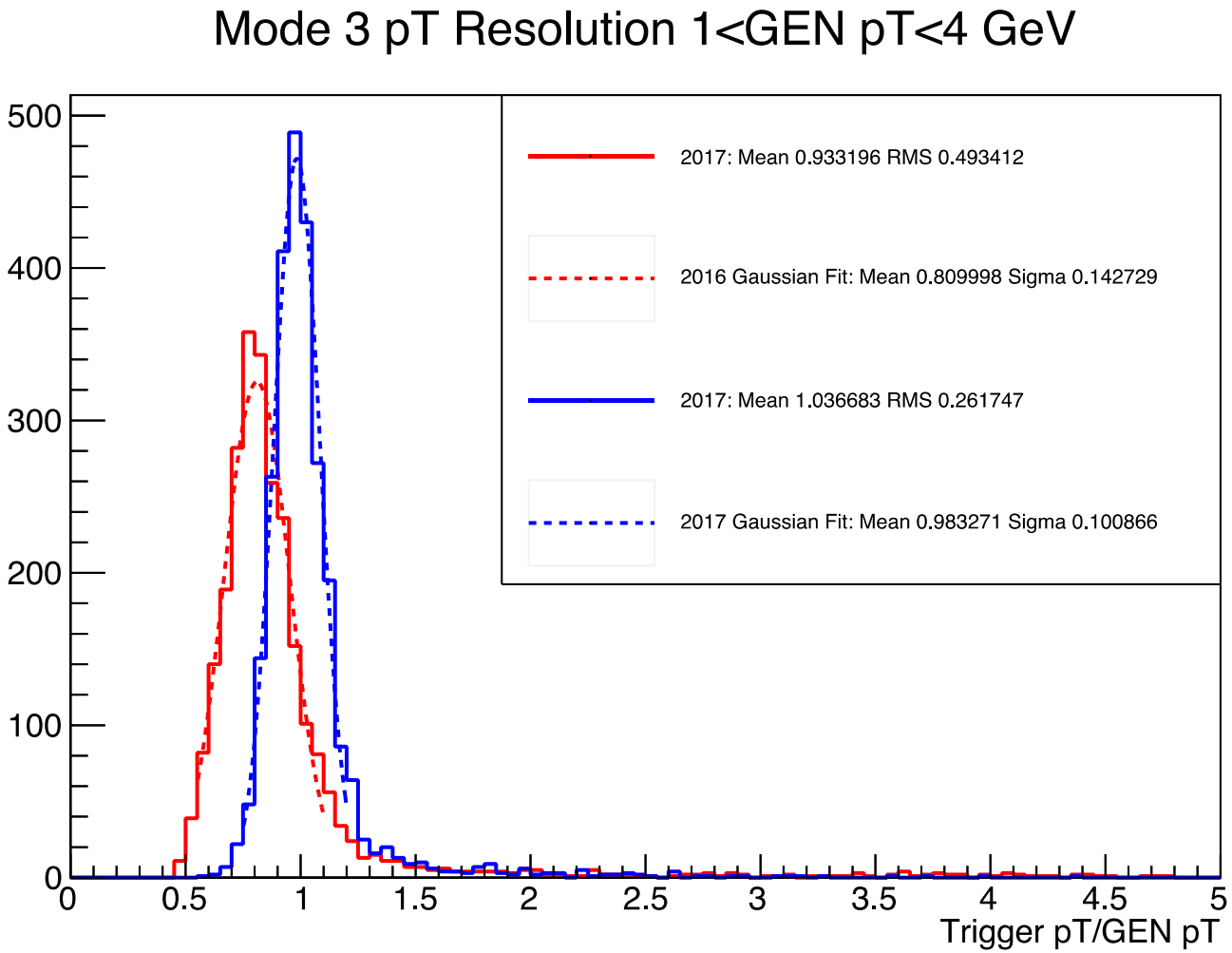
Mode 5 (station 2,4)



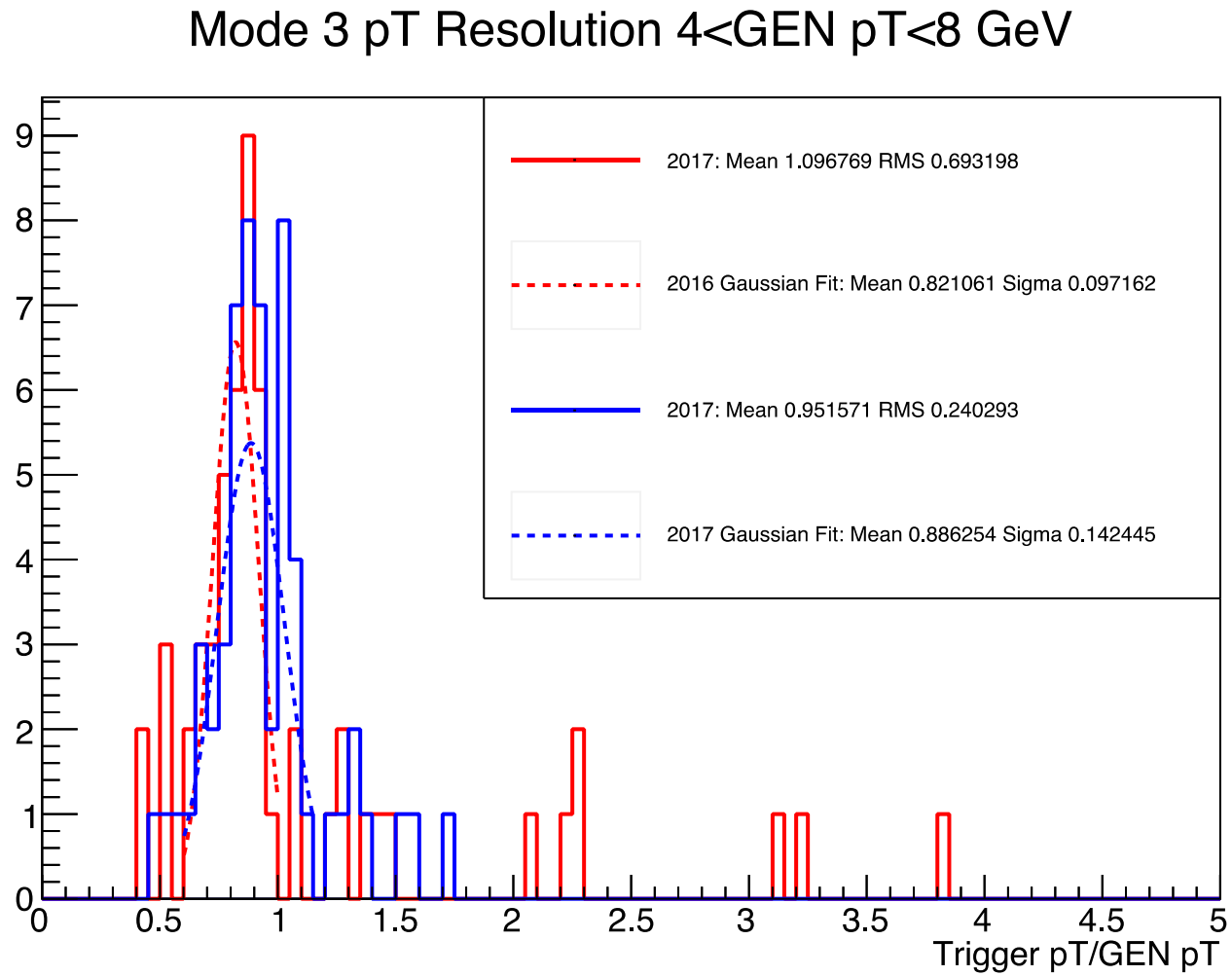
Mode 5 (station 2,4)



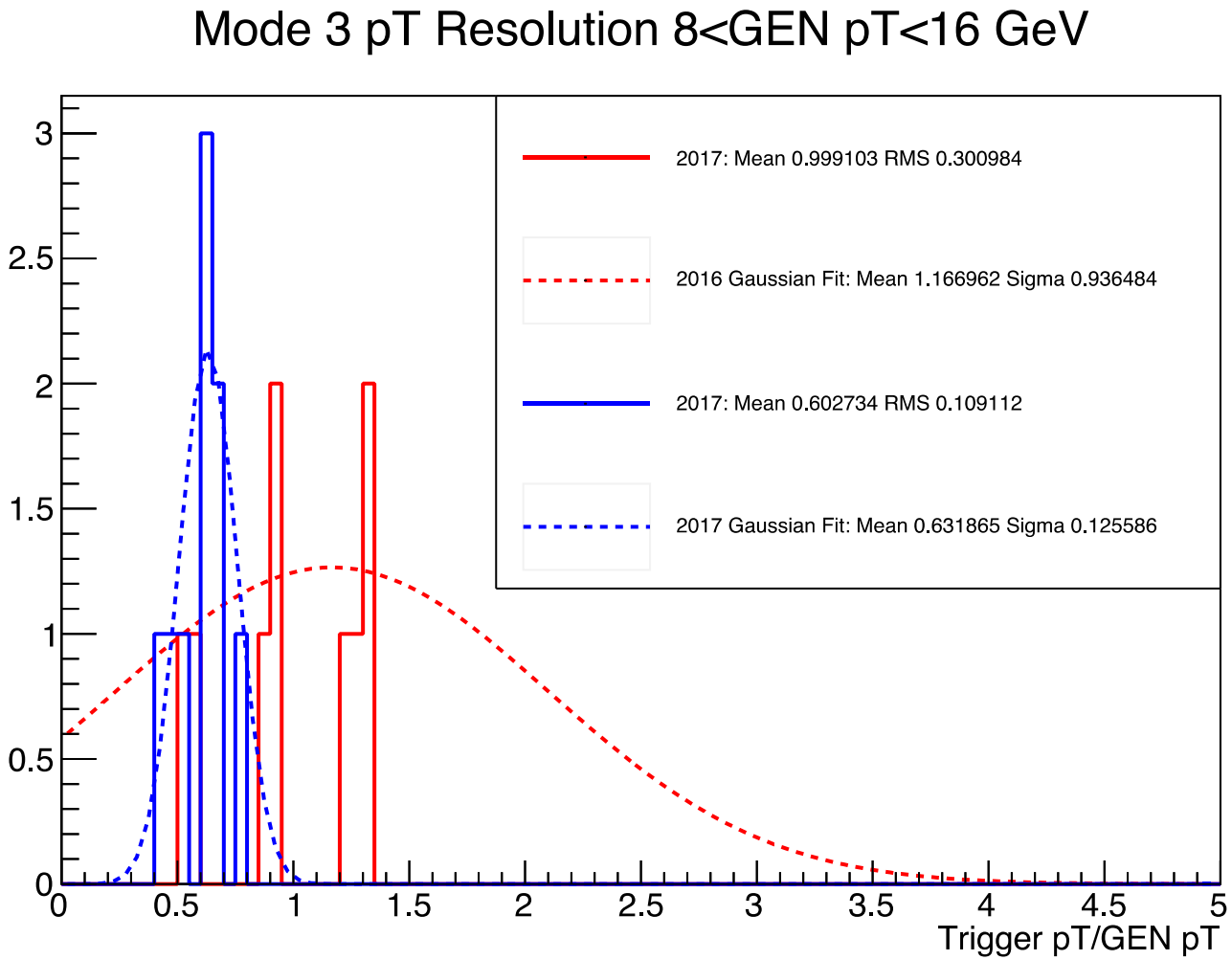
Mode 3 (station 3,4)



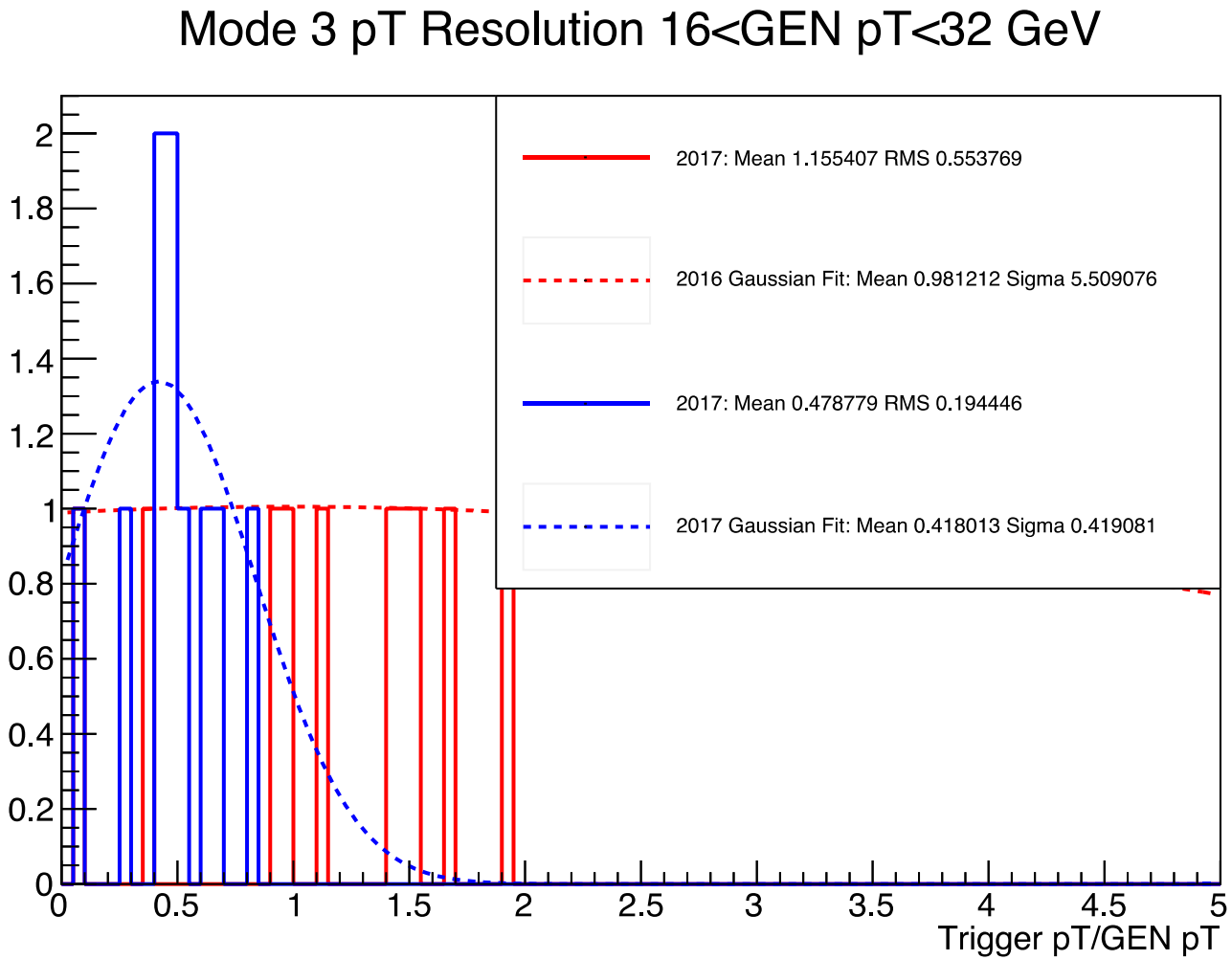
Mode 3 (station 3,4)



Mode 3 (station 3,4)



Mode 3 (station 3,4)



Summary Table

Mode 9
===Hist Info==

GEN pT Range[GeV]	2016 Mean	2017 Mean	2016 RMS	2017 RMS	2016 RMS/Mean	2017 RMS/Mean
(1, 4]	1.47	1.16	0.76	0.356	0.517	0.306
(4, 8]	0.962	1.04	0.638	0.443	0.663	0.426
(8, 16]	0.567	0.856	0.442	0.463	0.781	0.54
(16, 32]	0.371	0.656	0.395	0.398	1.06	0.607

===Fit Info==

GEN pT Range[GeV]	2016 Mean	2017 Mean	2016 Sigma	2017 Sigma	2016 Sigma/Mean	2017 Sigma/Mean
(1, 4]	0.97	1.06	0.172	0.131	0.178	0.124
(4, 8]	0.605	0.907	0.178	0.222	0.295	0.245
(8, 16]	0.349	0.711	0.115	0.22	0.33	0.309
(16, 32]	0.181	0.538	0.0657	0.246	0.363	0.458

Summary Table

Mode 6
===Hist Info==

GEN pT Range[GeV]	2016 Mean	2017 Mean	2016 RMS	2017 RMS	2016 RMS/Mean	2017 RMS/Mean
(1, 4]	1.11	1.13	0.716	0.337	0.645	0.299
(4, 8]	1.56	1.24	0.997	0.467	0.64	0.377
(8, 16]	1.64	0.965	0.882	0.345	0.538	0.357
(16, 32]	1.02	0.555	0.446	0.179	0.435	0.323

===Fit Info==

GEN pT Range[GeV]	2016 Mean	2017 Mean	2016 Sigma	2017 Sigma	2016 Sigma/Mean	2017 Sigma/Mean
(1, 4]	0.816	1.02	0.192	0.108	0.236	0.106
(4, 8]	0.885	1	0.161	0.145	0.182	0.144
(8, 16]	0.864	0.854	0.246	0.292	0.285	0.342
(16, 32]	0.867	0.522	0.391	0.149	0.452	0.286

Summary Table

Mode 5
===Hist Info==

GEN pT Range[GeV]	2016 Mean	2017 Mean	2016 RMS	2017 RMS	2016 RMS/Mean	2017 RMS/Mean
(1, 4]	1.35	1.25	0.797	0.471	0.591	0.377
(4, 8]	1.61	1.04	1.11	0.434	0.688	0.416
(8, 16]	1.4	0.66	0.944	0.291	0.673	0.441
(16, 32]	0.848	0.358	0.472	0.136	0.557	0.38

===Fit Info==

GEN pT Range[GeV]	2016 Mean	2017 Mean	2016 Sigma	2017 Sigma	2016 Sigma/Mean	2017 Sigma/Mean
(1, 4]	0.905	1.04	0.163	0.136	0.18	0.131
(4, 8]	0.885	0.876	0.238	0.259	0.269	0.296
(8, 16]	0.688	0.539	0.245	0.154	0.356	0.286
(16, 32]	0.705	0.321	0.305	0.0911	0.432	0.284

Summary Table

Mode 3

===Hist Info==

GEN pT Range[GeV]	2016 Mean	2017 Mean	2016 RMS	2017 RMS	2016 RMS/Mean	2017 RMS/Mean
(1, 4]	0.933	1.04	0.493	0.262	0.529	0.252
(4, 8]	1.1	0.952	0.693	0.24	0.632	0.253
(8, 16]	0.999	0.603	0.301	0.109	0.301	0.181
(16, 32]	1.16	0.479	0.554	0.194	0.479	0.406

===Fit Info==

GEN pT Range[GeV]	2016 Mean	2017 Mean	2016 Sigma	2017 Sigma	2016 Sigma/Mean	2017 Sigma/Mean
(1, 4]	0.81	0.983	0.143	0.101	0.176	0.103
(4, 8]	0.821	0.886	0.0972	0.142	0.118	0.161
(8, 16]	1.17	0.632	0.936	0.126	0.802	0.199
(16, 32]	0.981	0.418	5.51	0.419	5.61	1