# *bin-by-bin* Unfolding for Chi

- First I tried the default Crystal-ball fit following the twiki:

https://twiki.cern.ch/twiki/bin/view/CMSPublic/SWGuideJetResolution

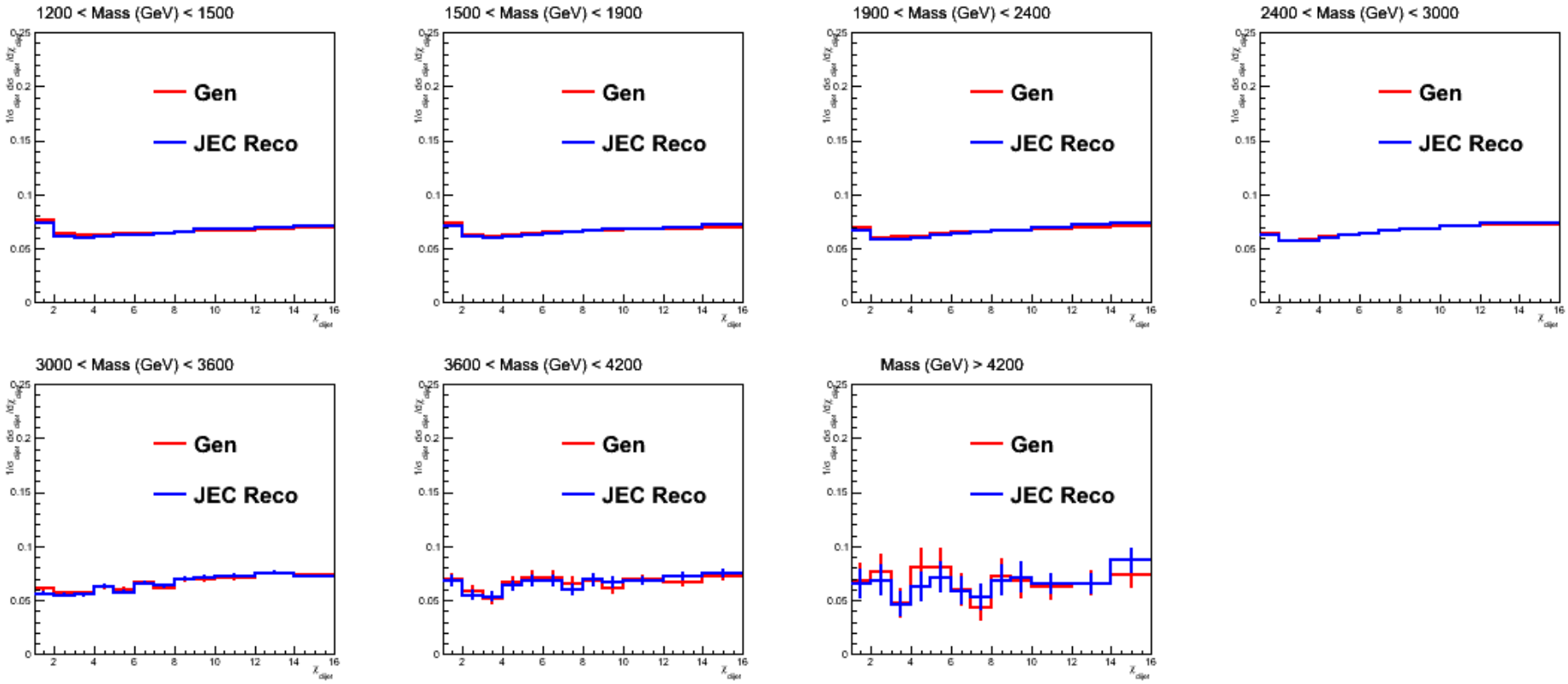
- I used the QCDHT samples:

/QCD_HT-**250To500**_TuneZ2star_8TeV-madgraph-pythia6/Summer12_DR53X-PU_S10_START53_V7A-v1/
/QCD_HT-**500To1000**_TuneZ2star_8TeV-madgraph-pythia6/Summer12_DR53X-PU_S10_START53_V7A-v1/
/QCD_HT-**1000ToInf**_TuneZ2star_8TeV-madgraph-pythia6/Summer12_DR53X-PU_S10_START53_V7A-v1/

- JEC used: 53X

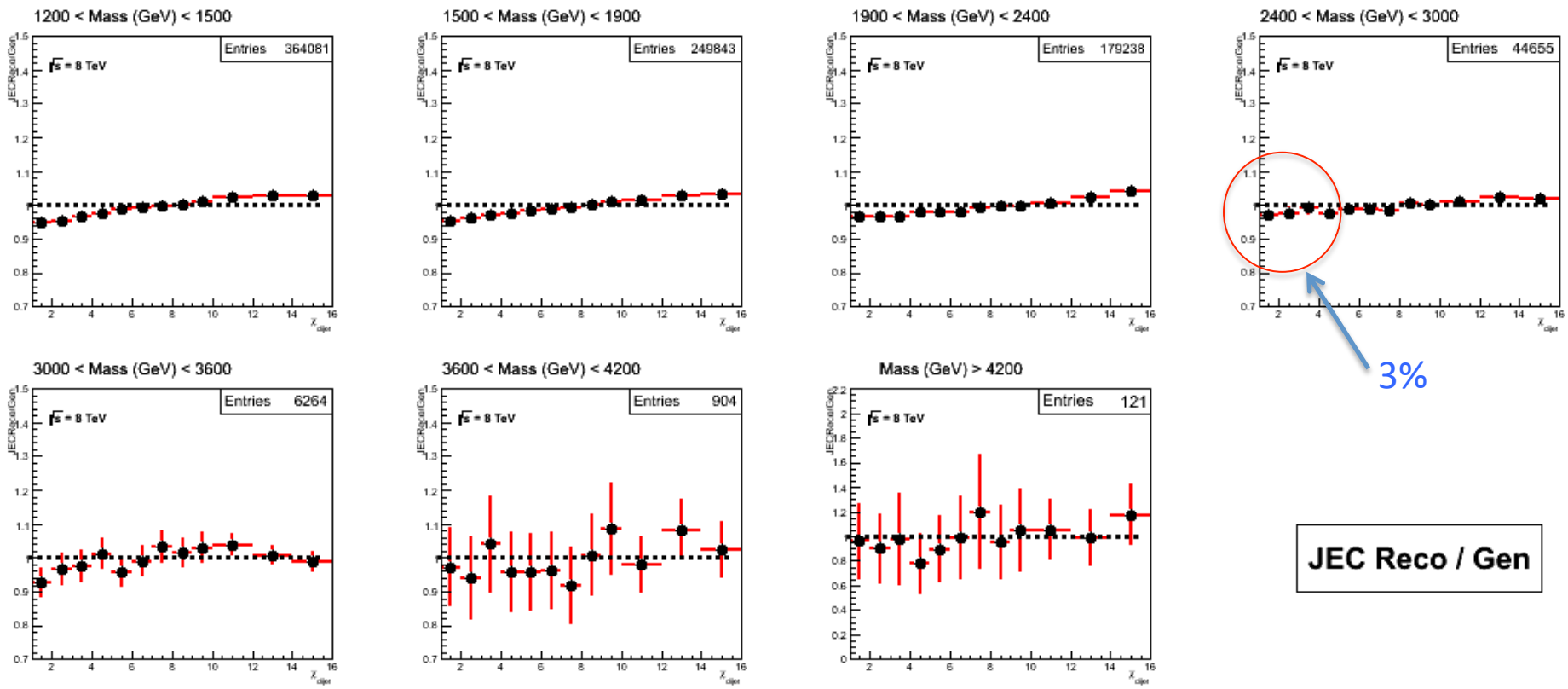
# Gen vs JEC Reco

QCDHT250+QCDHT500+QCDHT1000 sample



# JEC Reco / Gen

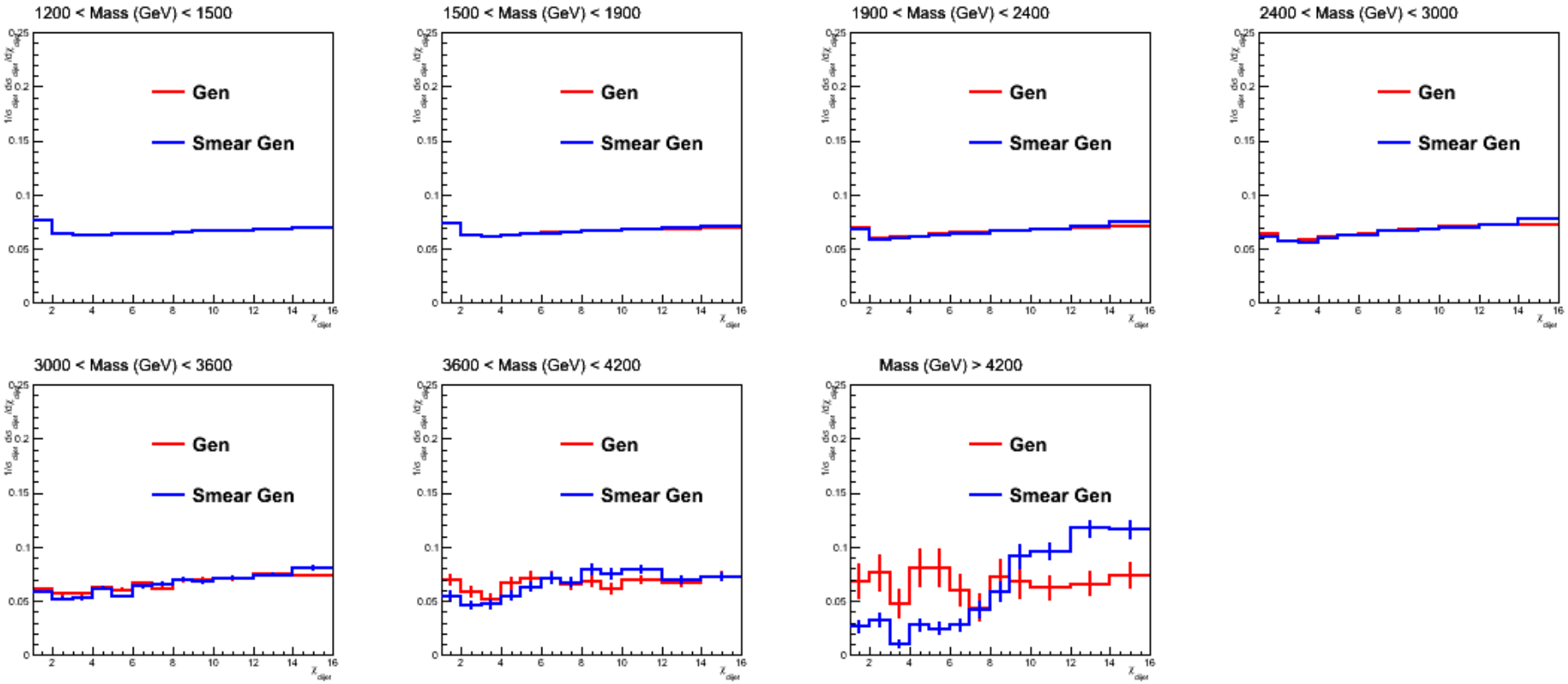
QCDHT250+QCDHT500+QCDHT1000 sample




**JEC Reco / Gen**

# Gen vs smeared Gen

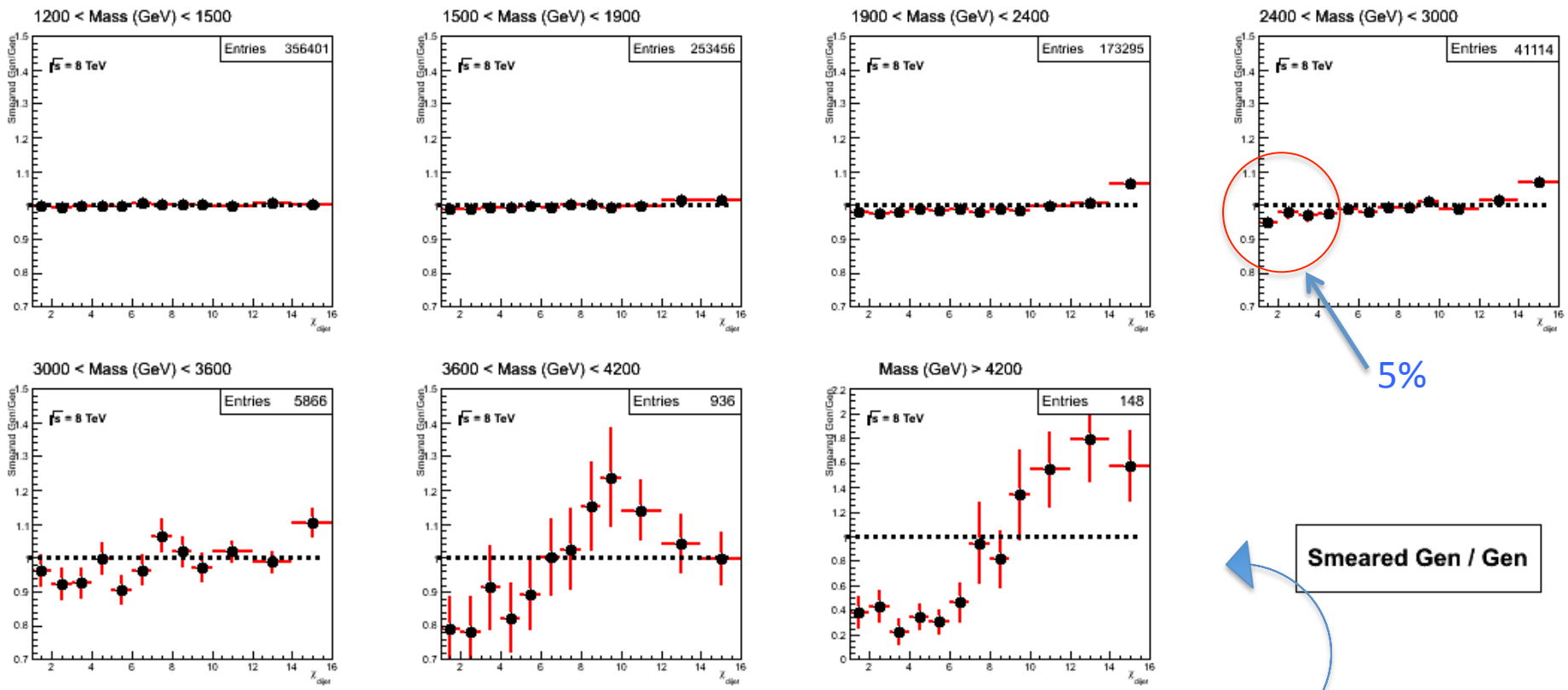
QCDHT250+QCDHT500+QCDHT1000 sample




- Smearing with Gaussian+tail was not doing a good job at high tails.

# Smeared Gen / Gen

QCDHT250+QCDHT500+QCDHT1000 sample




- Smearing with Gaussian+tail was not doing a good job at high tails.

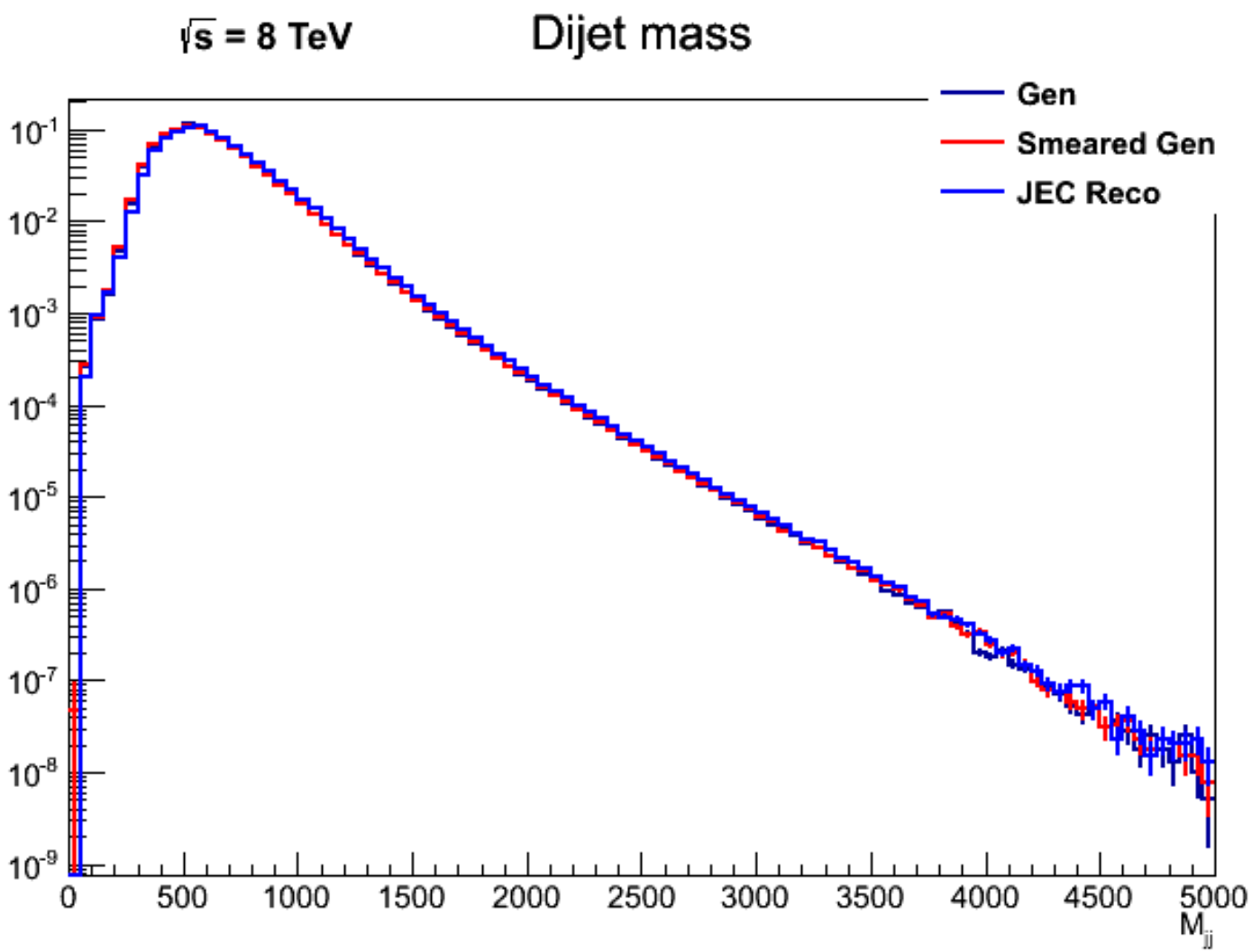
# Smearing with Gaussian with MC/data scale factors

- The smearing factors used so far were derived from MC. In addition data/MC scale factors for the resolution are available for the Gaussian core resolution:
  https://twiki.cern.ch/twiki/bin/view/CMS/JetResolution

| eta bin | Data/MC Ratio (factor +-stat. +syst.- syst.) |
|---|---|
| 0.0–0.5 | 1.052+-0.012+0.062-0.061 |
| 0.5–1.1 | 1.057+-0.012+0.056-0.055 |
| 1.1–1.7 | 1.096+-0.017+0.063-0.062 |
| 1.7–2.3 | 1.134+-0.035+0.087-0.085 |
| 2.3–5.0 | 1.288+-0.127+0.155-0.153 |

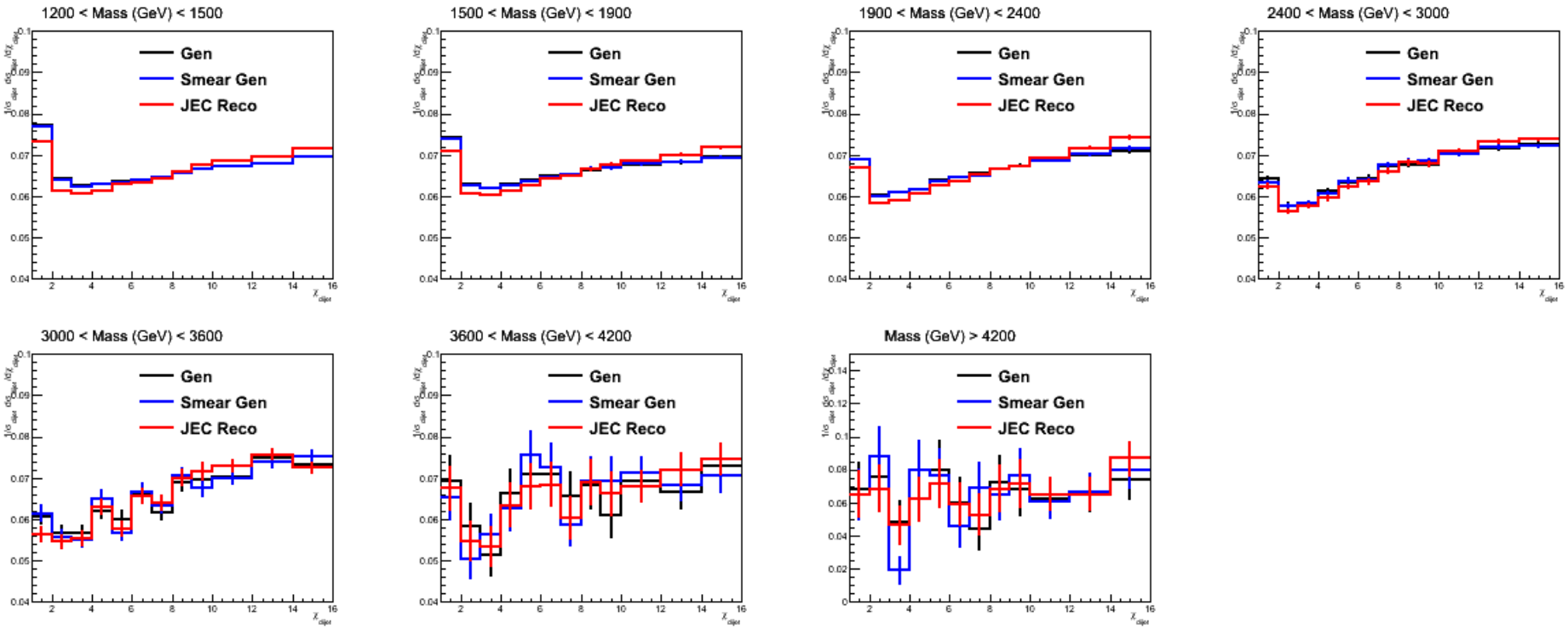
- I made Gaussian-only Smearing, where I modified the width of the Gaussian according to the data/MC scale factors for the resolution

# Dijet Mass


√s = 8 TeV
Dijet mass
Gen
Smeared Gen
JEC Reco
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
10^-7
10^-8
10^-9
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
M_jj

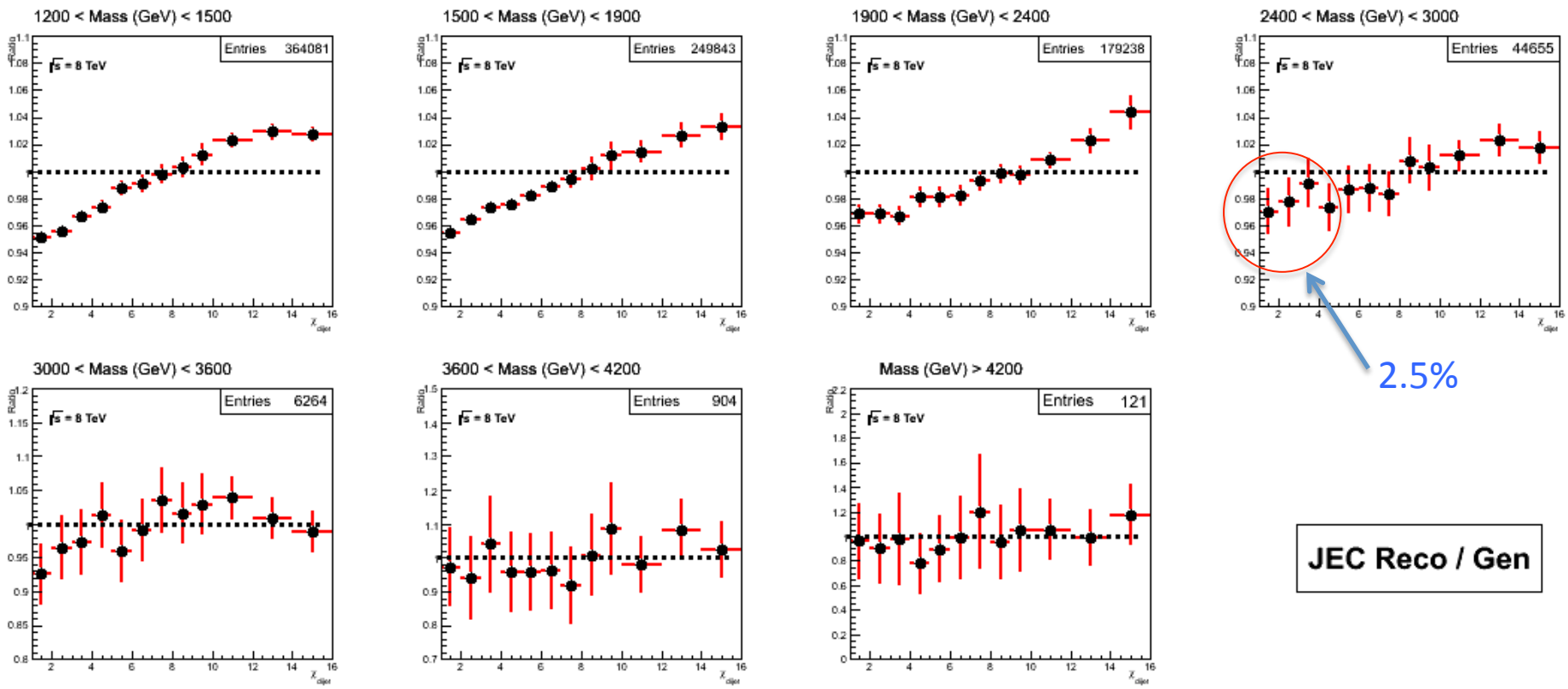
# Gen / JEC Reco / Smeared Gen

- I overlay the distributions : Y-axis range are different in the last two mass bins



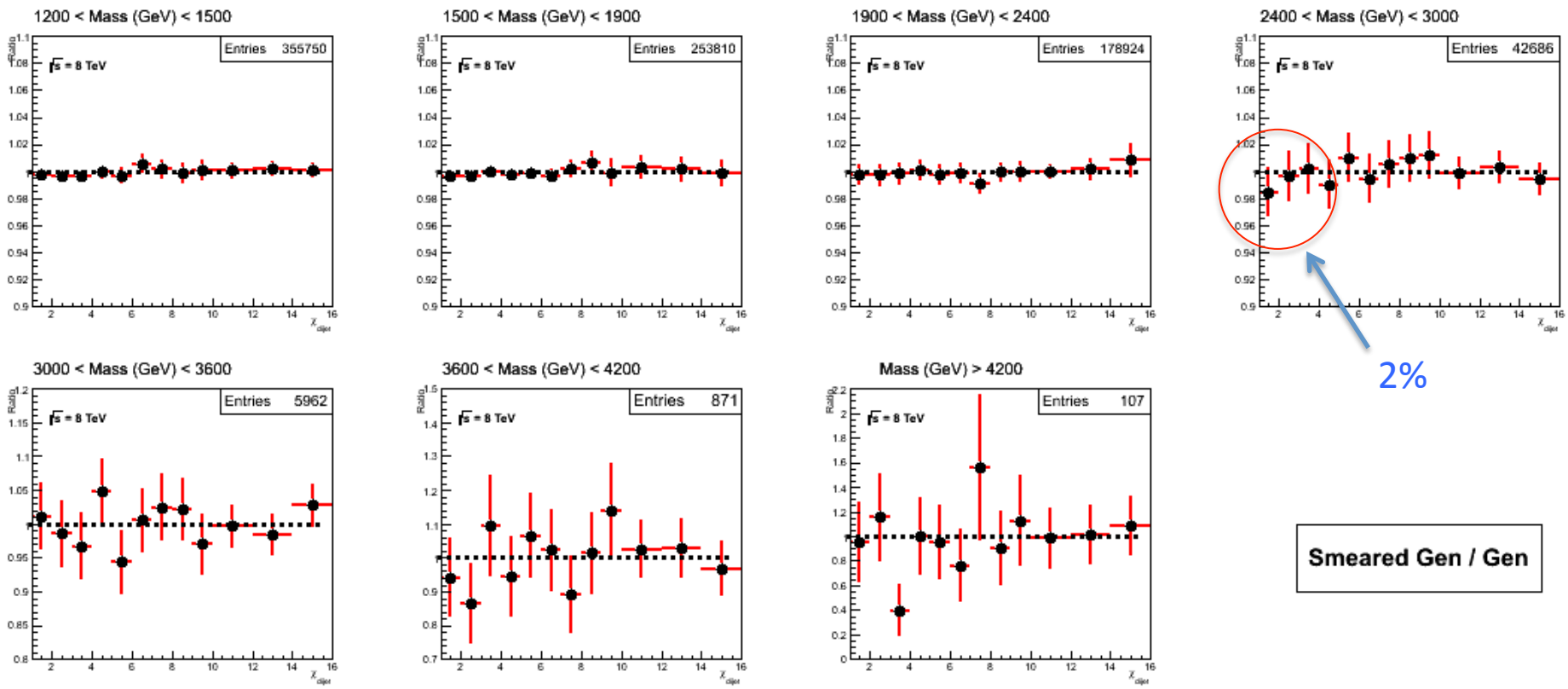

- Here the smearing is Gaussian-only (with mc/data scale factors)

# JEC Reco / Gen (zoomed in version of slide 3)



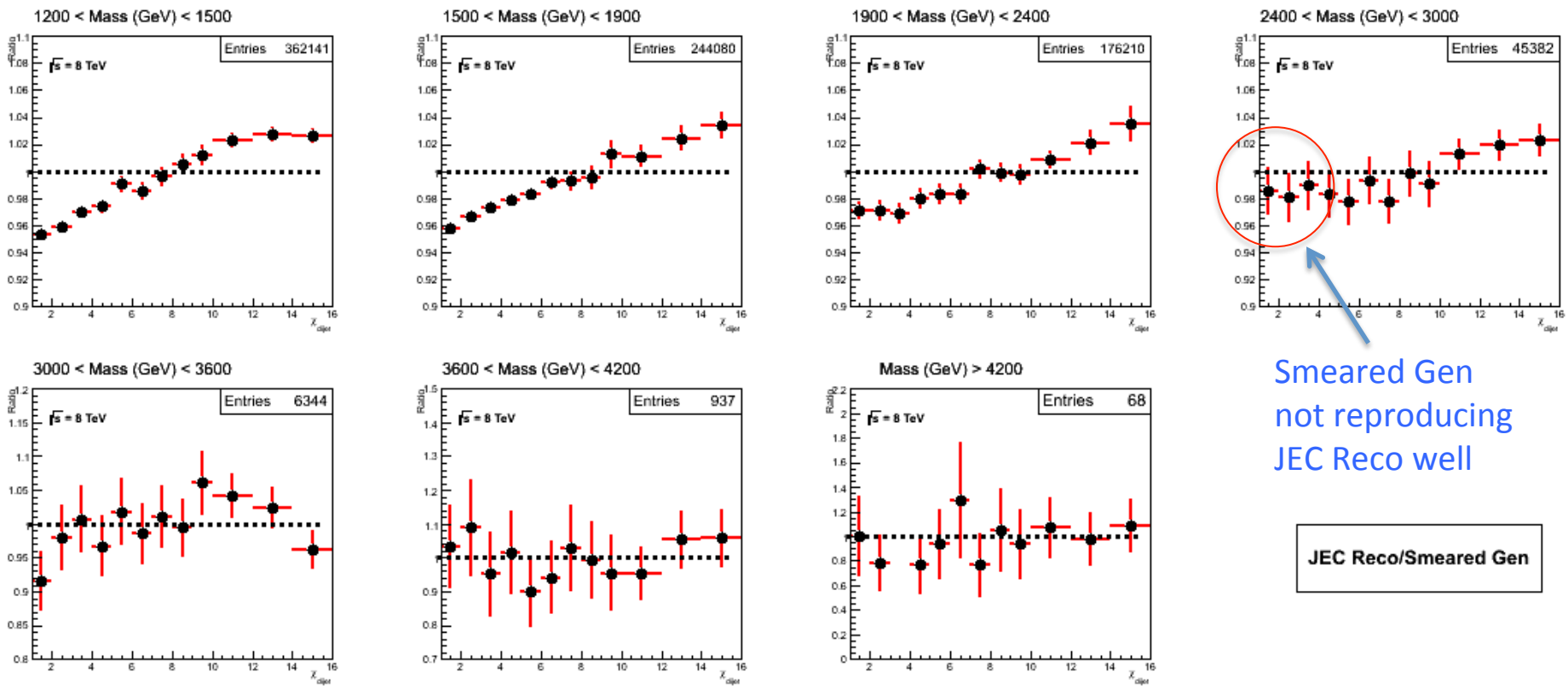

**JEC Reco / Gen**

# Smeared Gen / Gen




Looks like these Gaussian-only smearing with scale factors still not reproducing it well.

# JEC Reco / Smeared Gen




Smeared Gen not reproducing JEC Reco well

JEC Reco/Smeared Gen