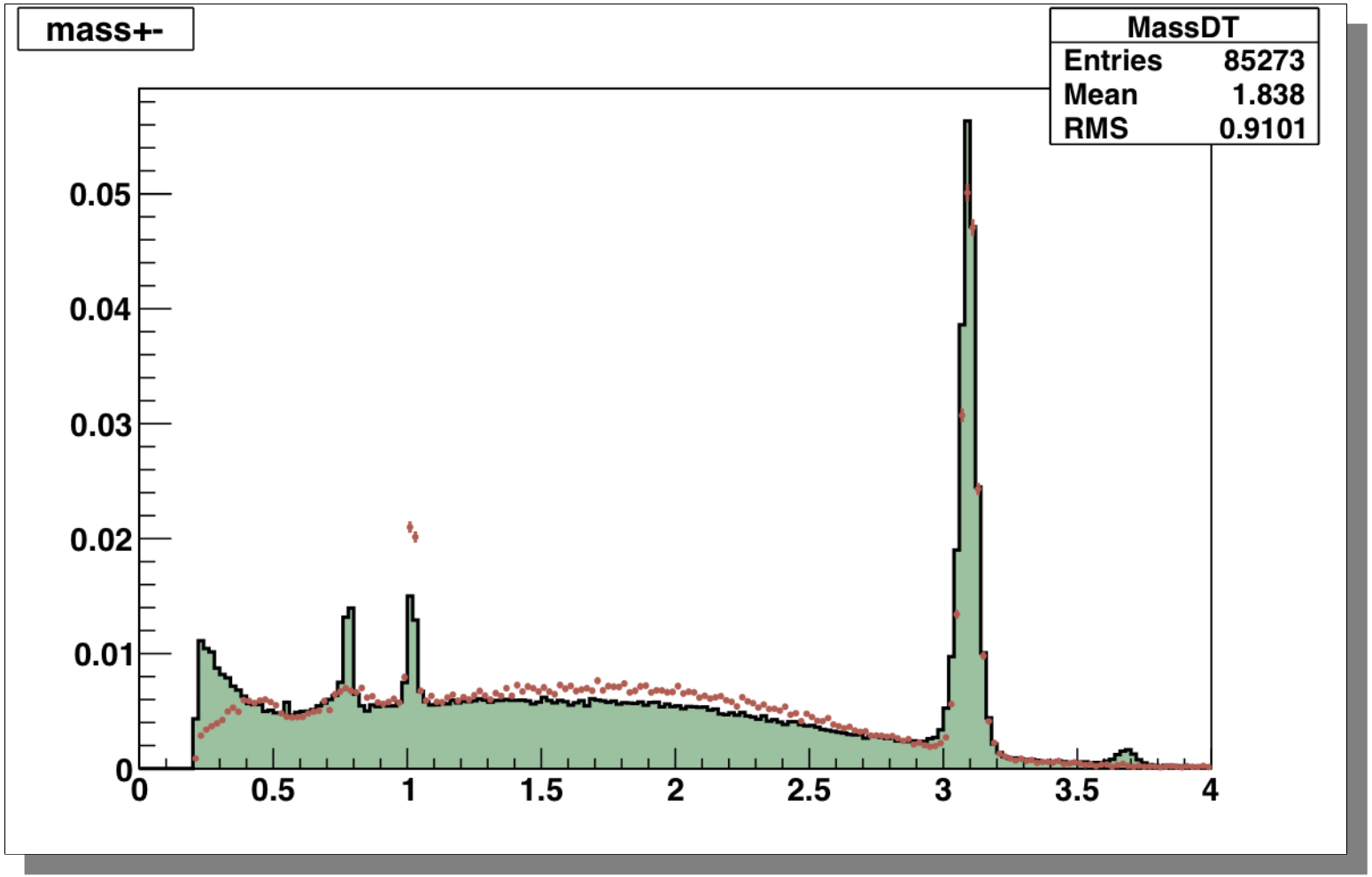
Le mie ultime pippe

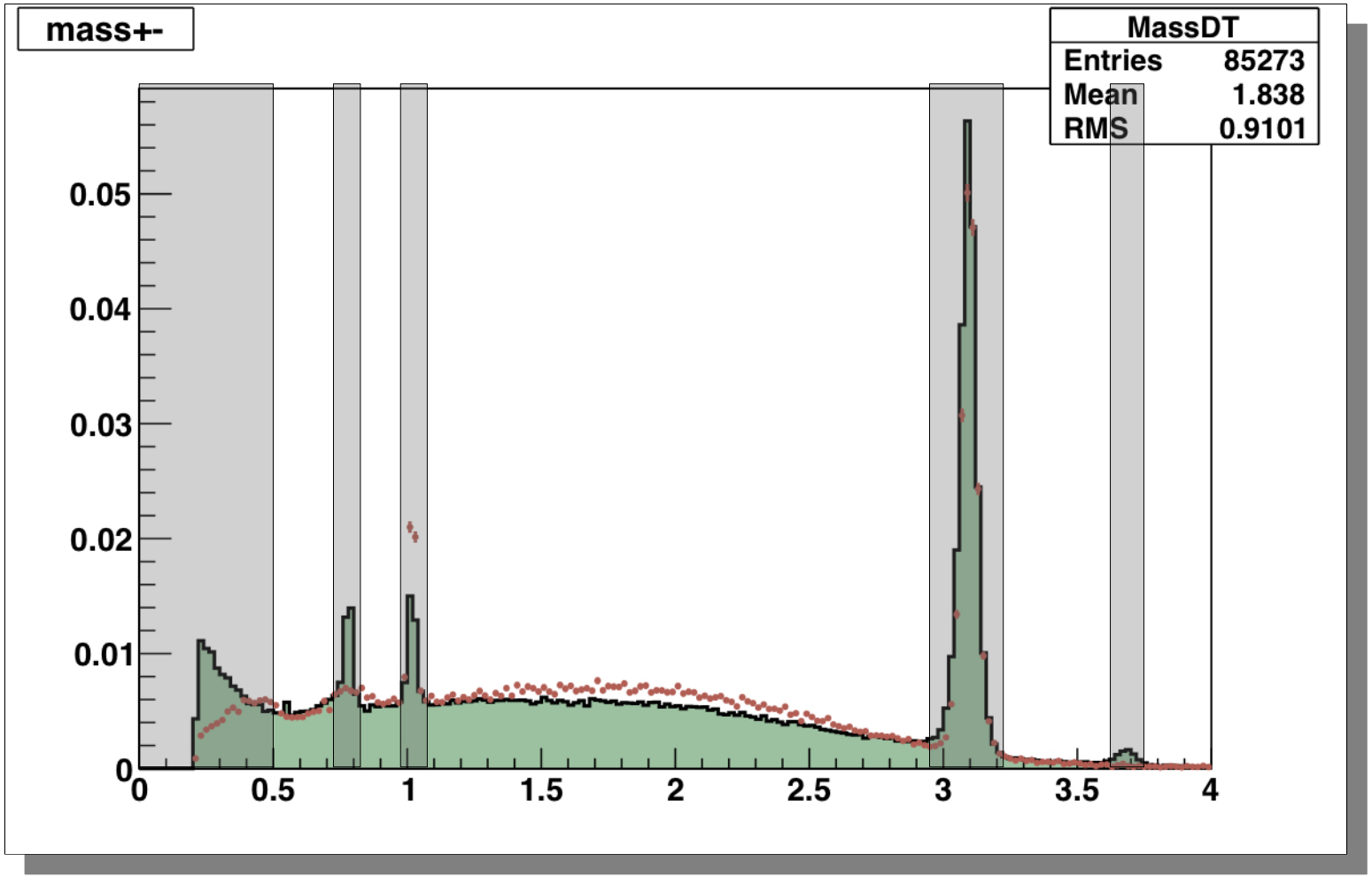
- Nicola & Jacopo proved that using data driven p_T^{out} shape for light quarks does not affect the result
- Next step : check p_T^{out} spectra for primary (bP) & sequantial (bS) B decays
- Means: select events with two muons coming **from the same jet**
- Muon selection: as usual (quality, $p_T > 4$, $|\eta| < 2.1$, Jet PF $p_T > 10$)
- Need to cut $M(\mu\mu)$ to get rid of low-mass resonances

$M(\mu^+\mu^-)$



Rosso : MC Verde : Dati

$M(\mu^+\mu^-)$

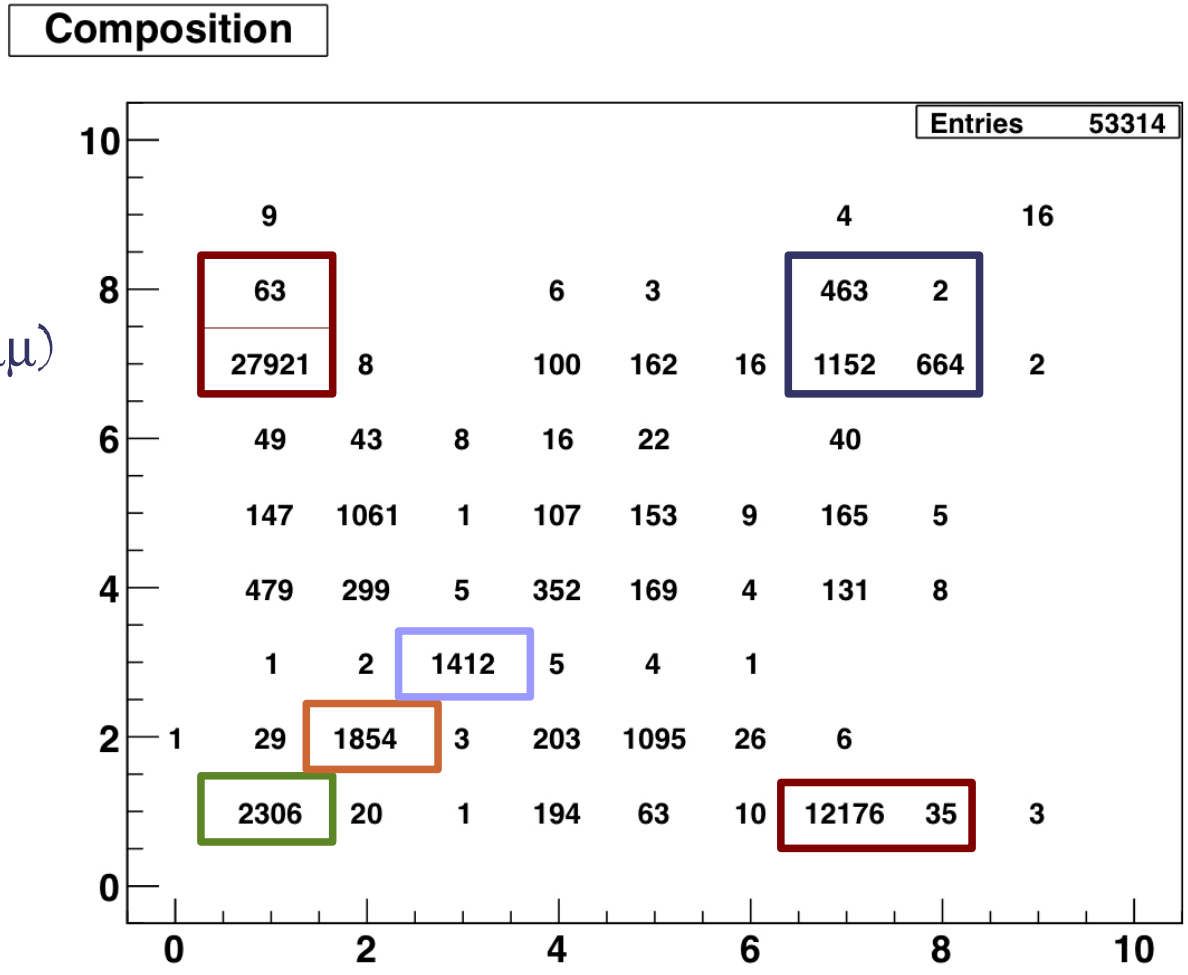


Rosso : MC Verde : Dati

Sample Composition in MC

μ classes :

1. B –>μ ν X
2. D –>μ ν X
3. Prompt (incl. ρ–>μμ)
4. DIF low TOF
5. DIF high TOF
6. Punch Through
7. B –> XD –> μνX'
8. B –> Xτ –> μνX'
9. Resonances



bPbS ~ 75%
bPbP ~ 5%
bSbS ~ 2%
cc ~ 3%
pp ~ 2%

Sample Composition in MC

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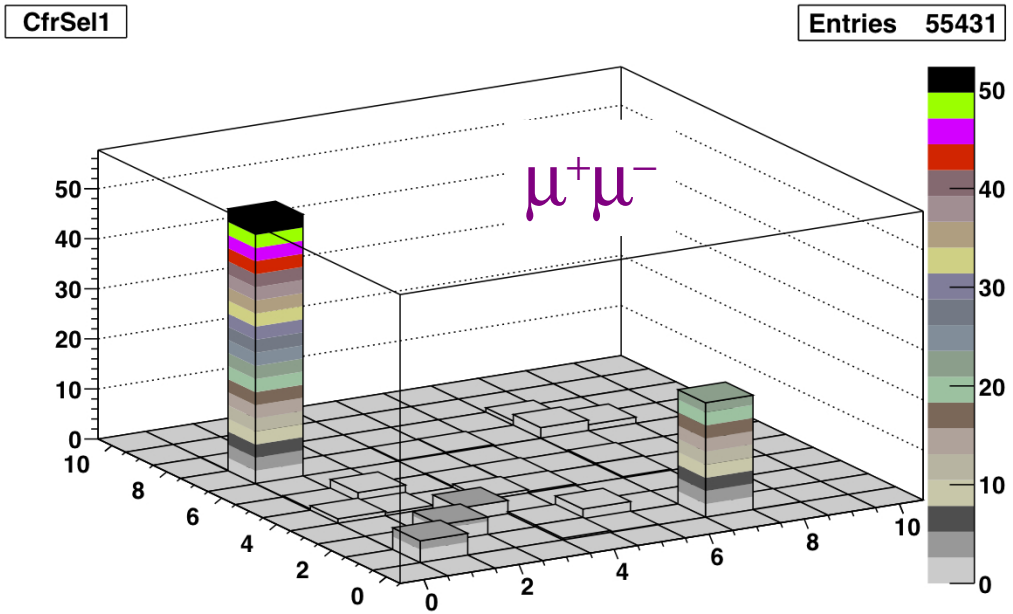
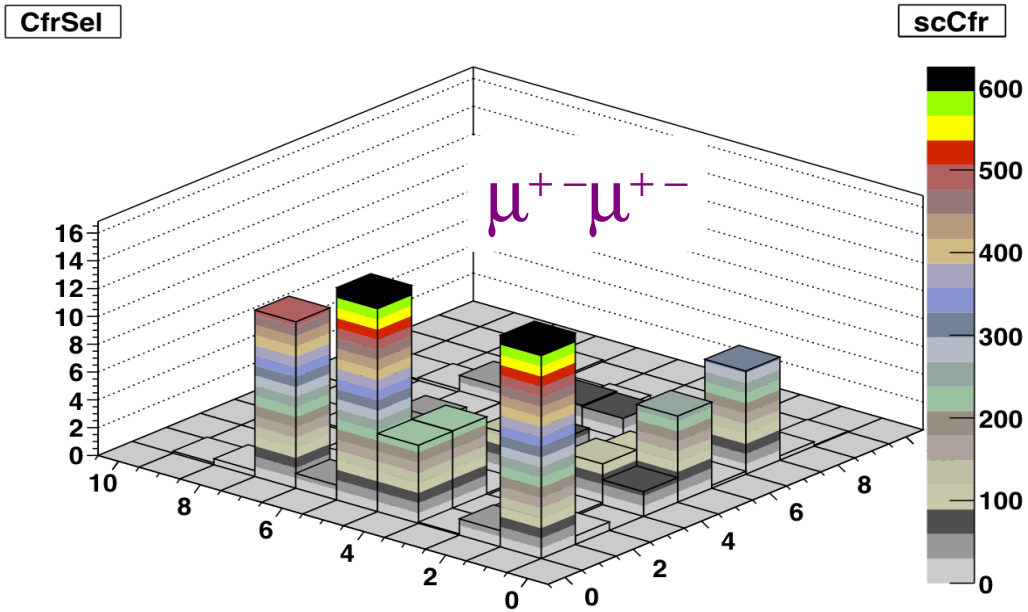
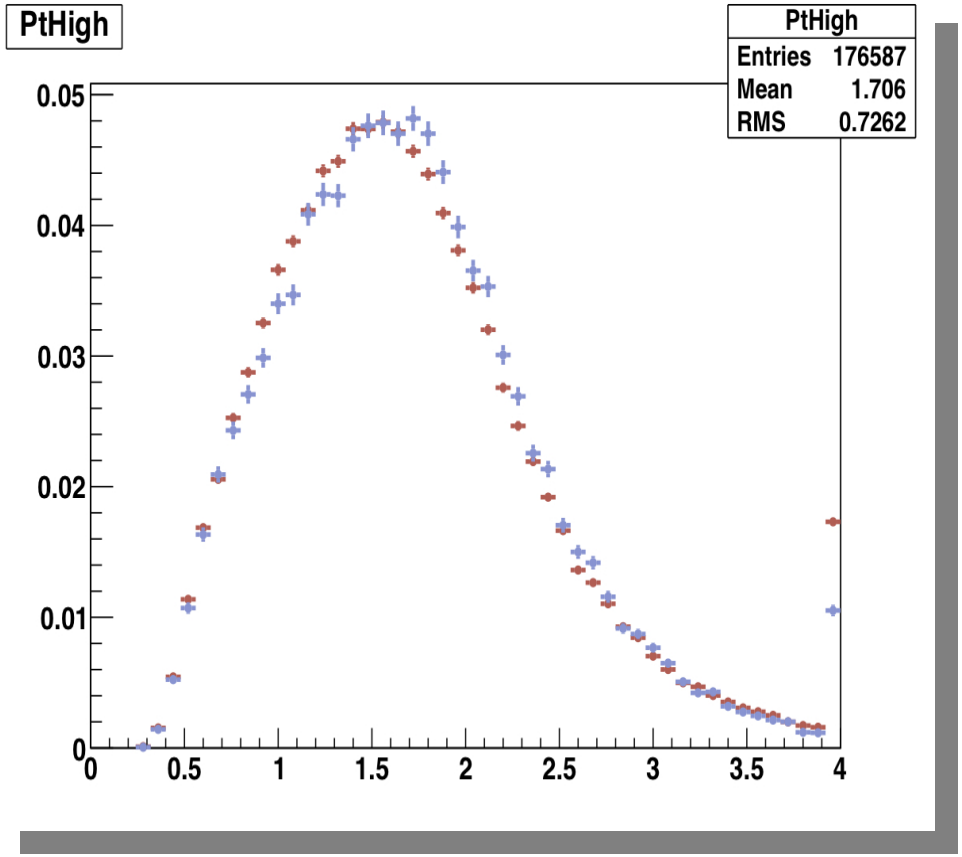


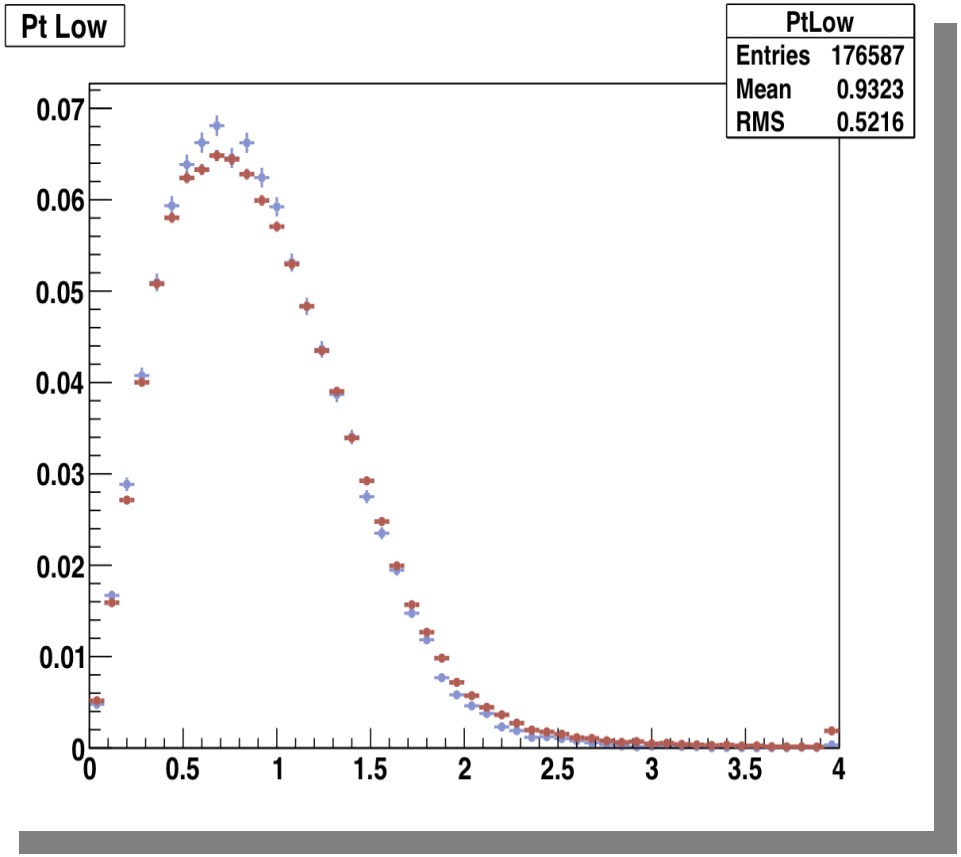


Rough Comparison to Data

Max(P_T^{out}(1,2))



Min(P_T^{out}(1,2))

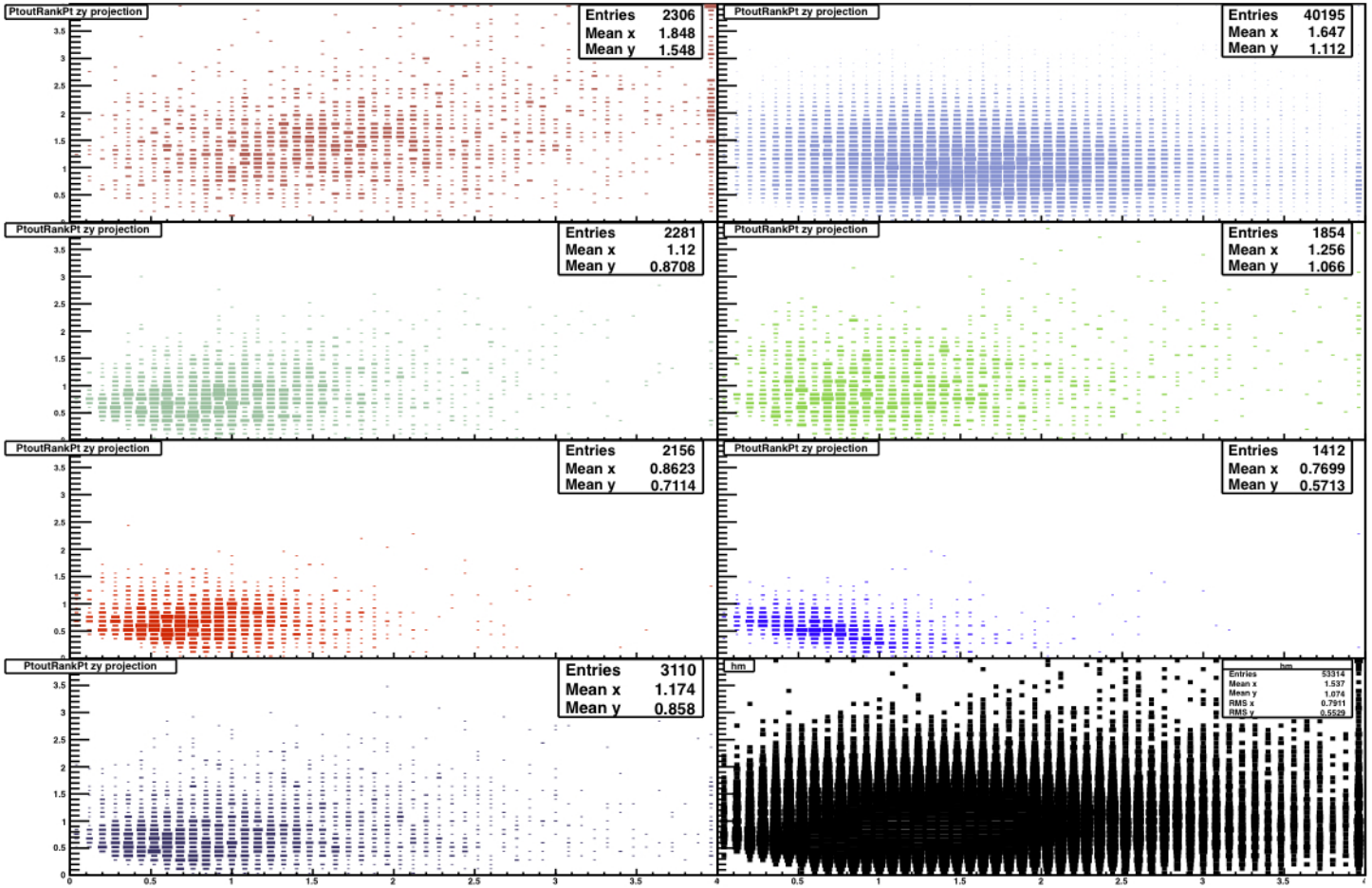


Red : data Blue : MC

Dimuon classes

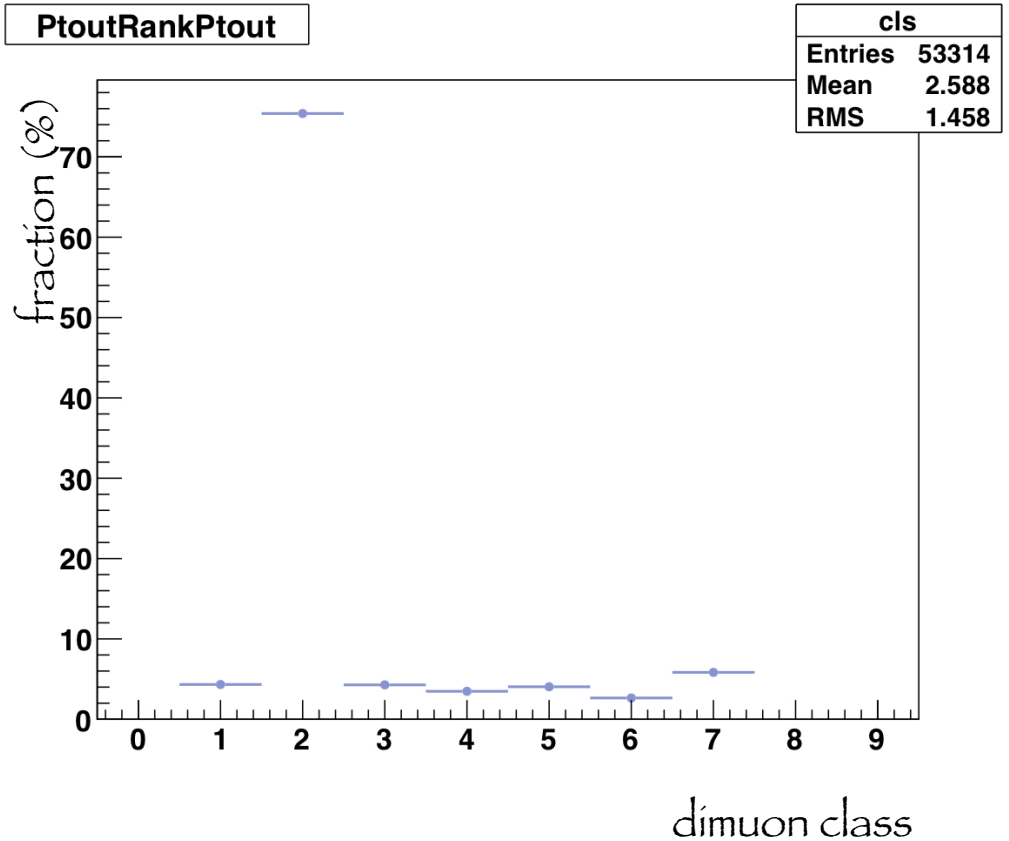
Group dimuons into 7 classes

1. bPbP
2. bPbS + bSbP
3. bSbS
4. c c
5. cD+Dc
6. pp
7. all the rest



Fit to the data

- Fit 2D distribution with TFractionFitter
- Allow 3 floating fraction, fix the others to the simulation prediction
- Fit either
  - p_T^{out}(Max) vs p_T^{out}(Min)
  - Symmetrized
  - vary ranges
  - vary floating contribution

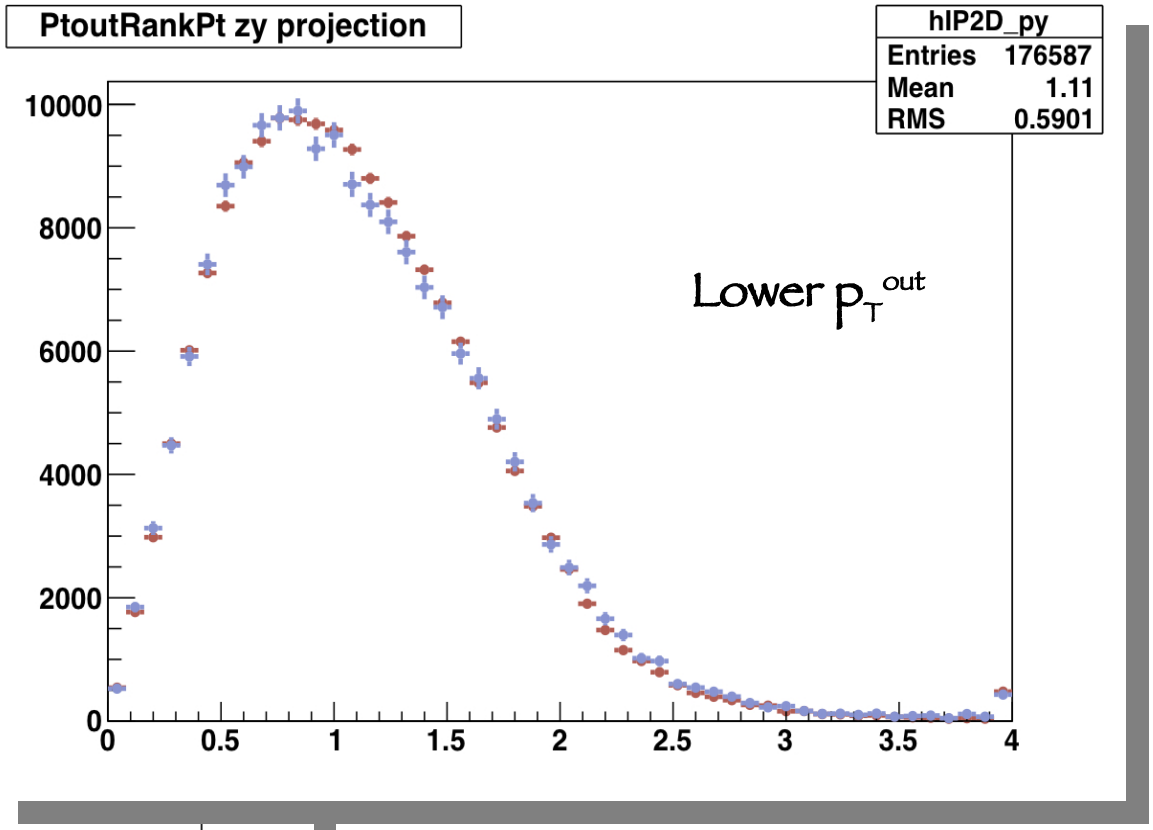


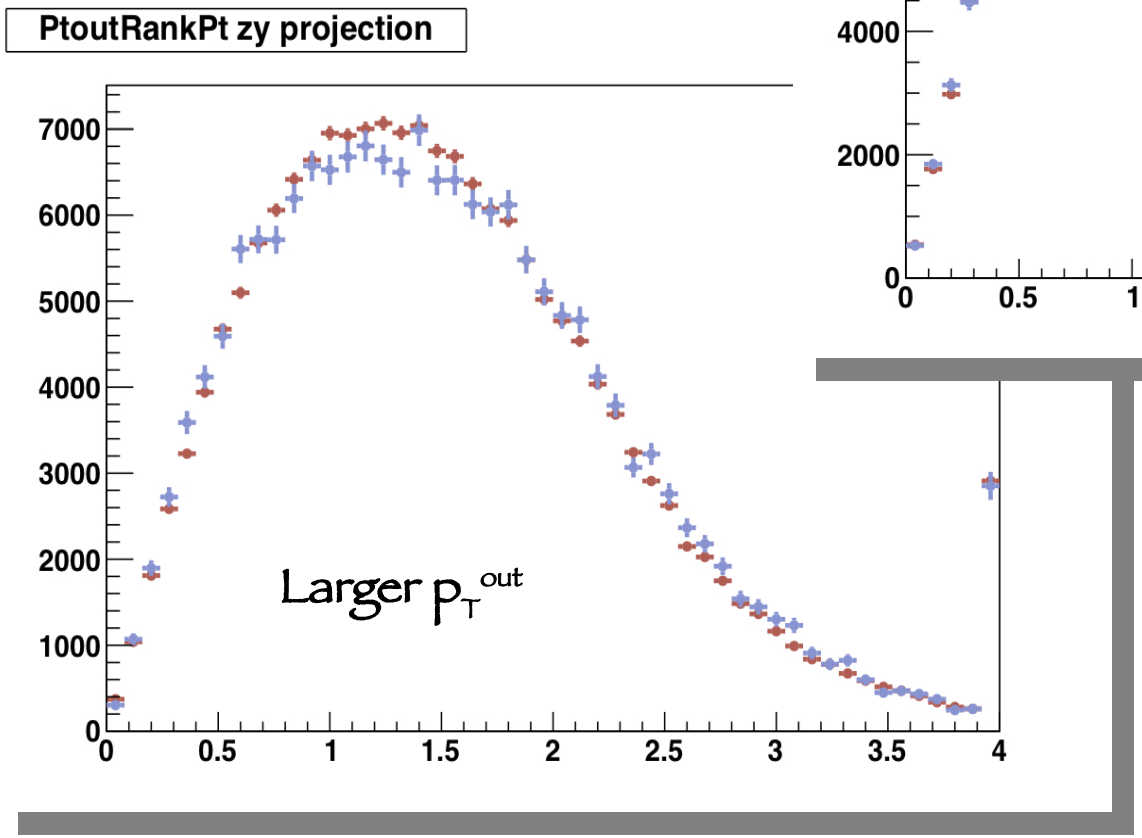
Fit Results

Class	MC truth	fit(1)	fit(2)	fit(3)
1	0.043	0.17(0.01)	0.18(0.01)	0.17(0.01)
2	0.75	0.58(0.01)	0.57(0.01)	0.56(0.01)
3	0.043	0.09(0.009)	_	_
4	0.035	_	_	0.10(0.01)
5	0.04	_	_	_
6	0.027	_	_	_
7	0.058	_	0.11(0.01)	_

Almost insensitive to range variation, muon ordering

Fit Projections: p_T^{max} vs p_T^{min}





Red : data

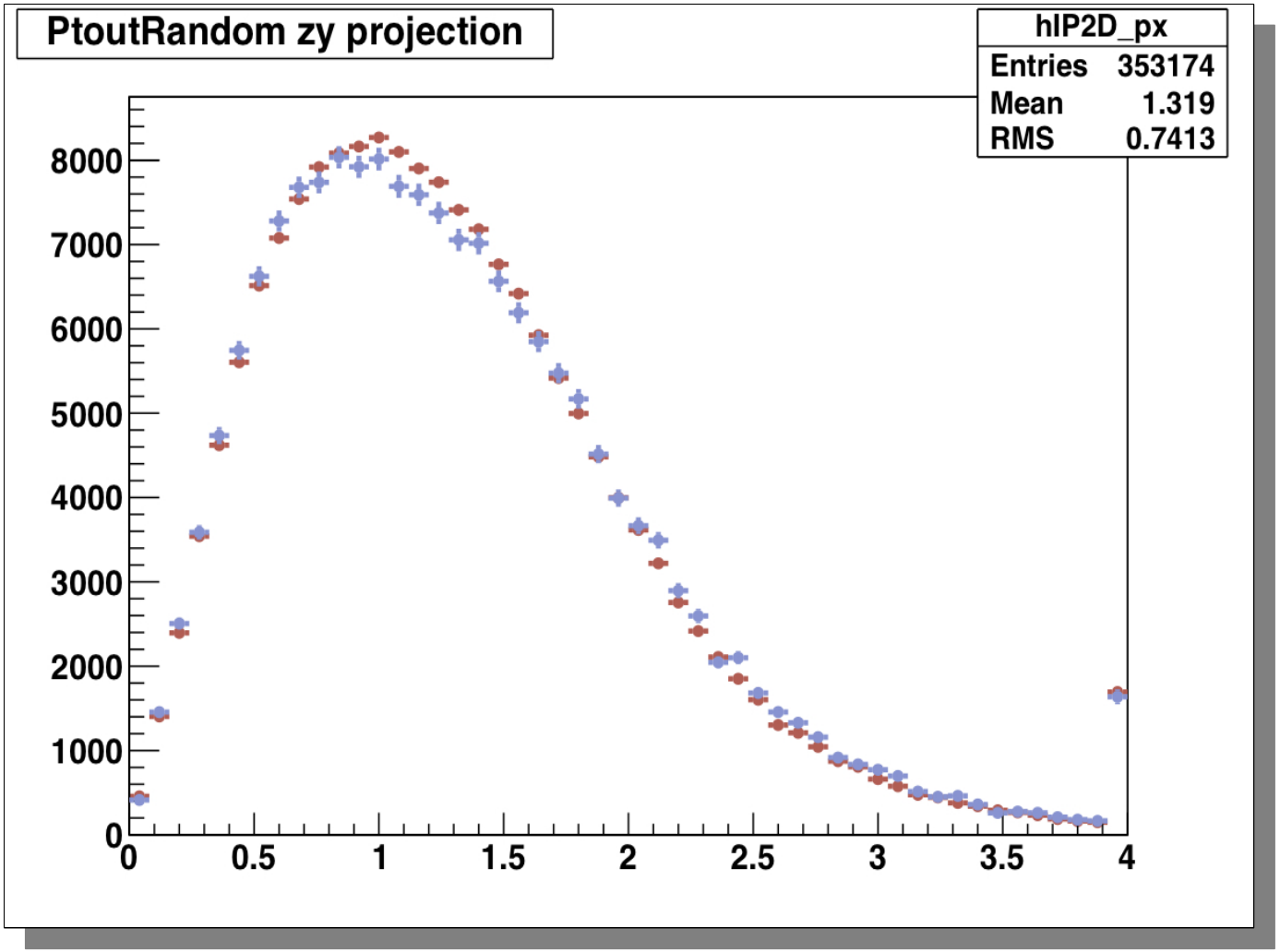
Blue : MC

Fit Projection: Symmetrized

Simmetrization as suggested by Greg. In each event do

- `h->Fill( pt1,pt2,0.5 );`
- `h->Fill( pt2,pt1,0.5 );`

for both data and MC



Conclusions

- Same jet dimuons provide a sample enriched in bPbS decays (75% pure in the simulation), allowing a test of the signal and the nasties background components
- Slight discrepancies in the rough comparison of MC spectra to data
- Fits enhance bPbP contibution by ~ 3, consistent with larger gluon splitting contribution also observed in other CMS paper
- The agreement between the fit result and the data is excellent, so

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- Same jet dimuons provide a sample enriched in bPbS decays (75% pure in the simulation), allowing a test of the signal and the nasties background components
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No Problem in the bP, bS spectra ?

Addendum

- Wish to fit muons in different jets as well
- ... however those used for χ measurement have a problem:
- component sum does not match MC inclusive distribution