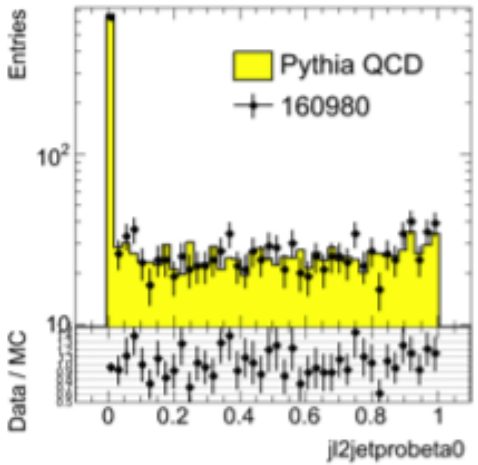
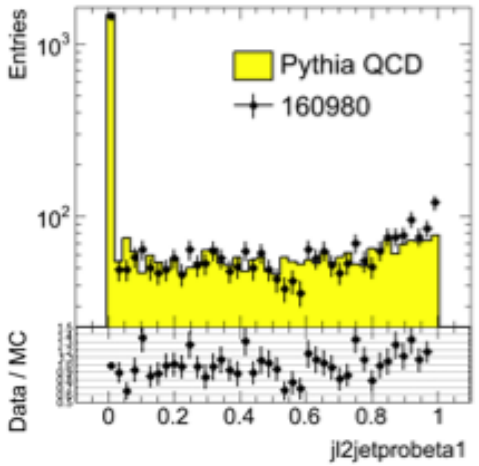
Enabling *b*-jet trigger selection (?)

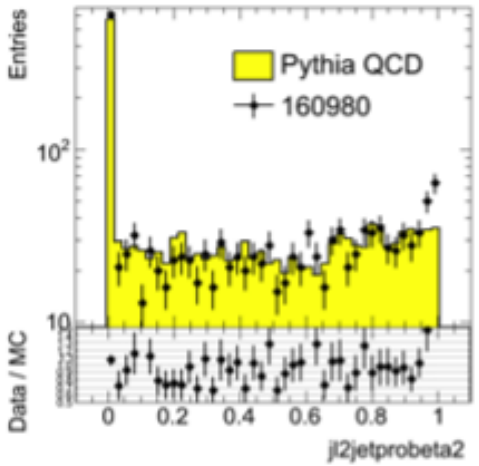
b-jet trigger signature group

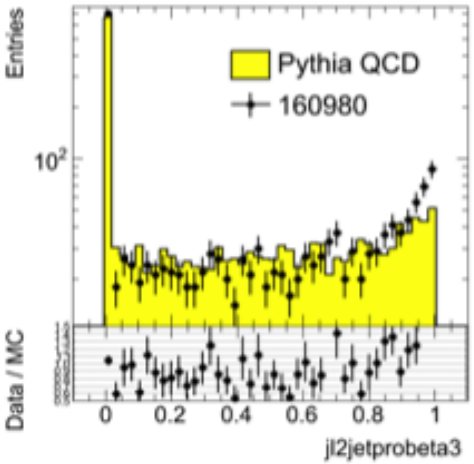
October 5, 2010

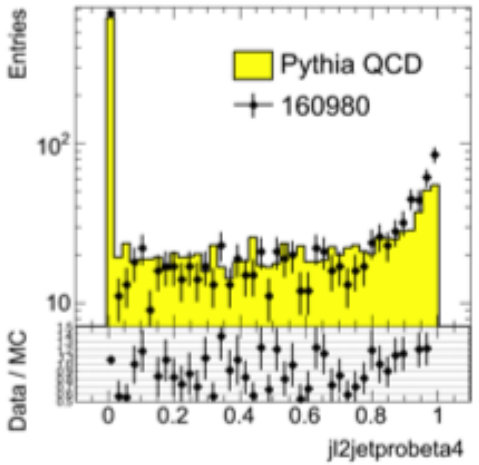
Data/MC comparison of HLT JetProb distributions











Bins of |jet η|

0: |η|<0.3
1: 0.3<|η|<1.0
2: 1.5<|η|<1.5
3: 1.5<|η|<2.0
4: 2.0|η|<2.5

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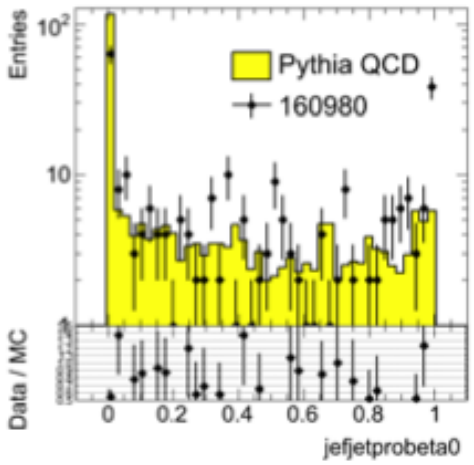
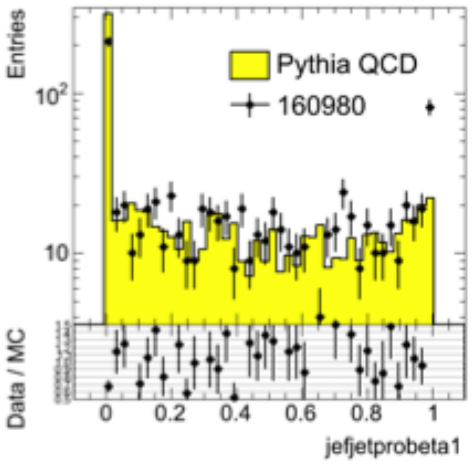
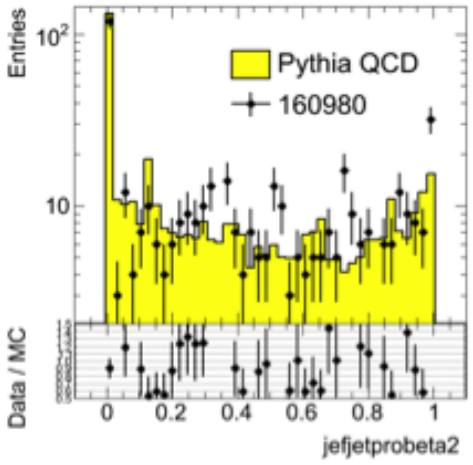
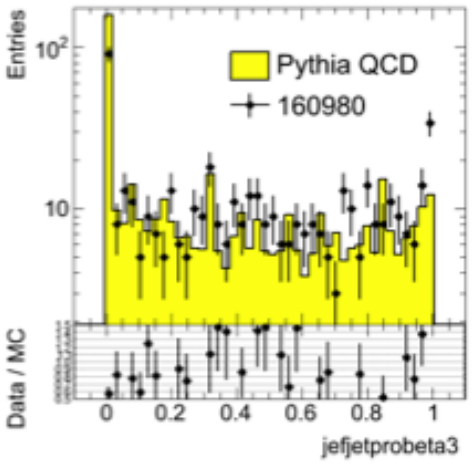
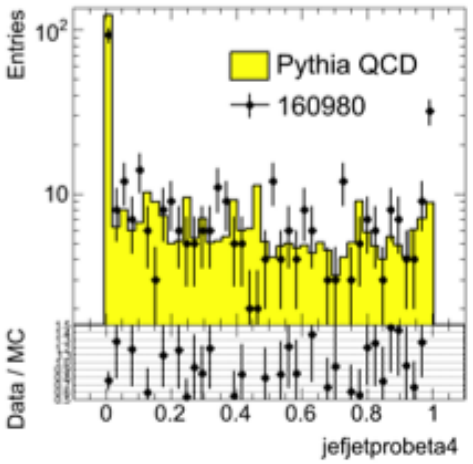
Data/MC comparison of HLT JetProb distributions











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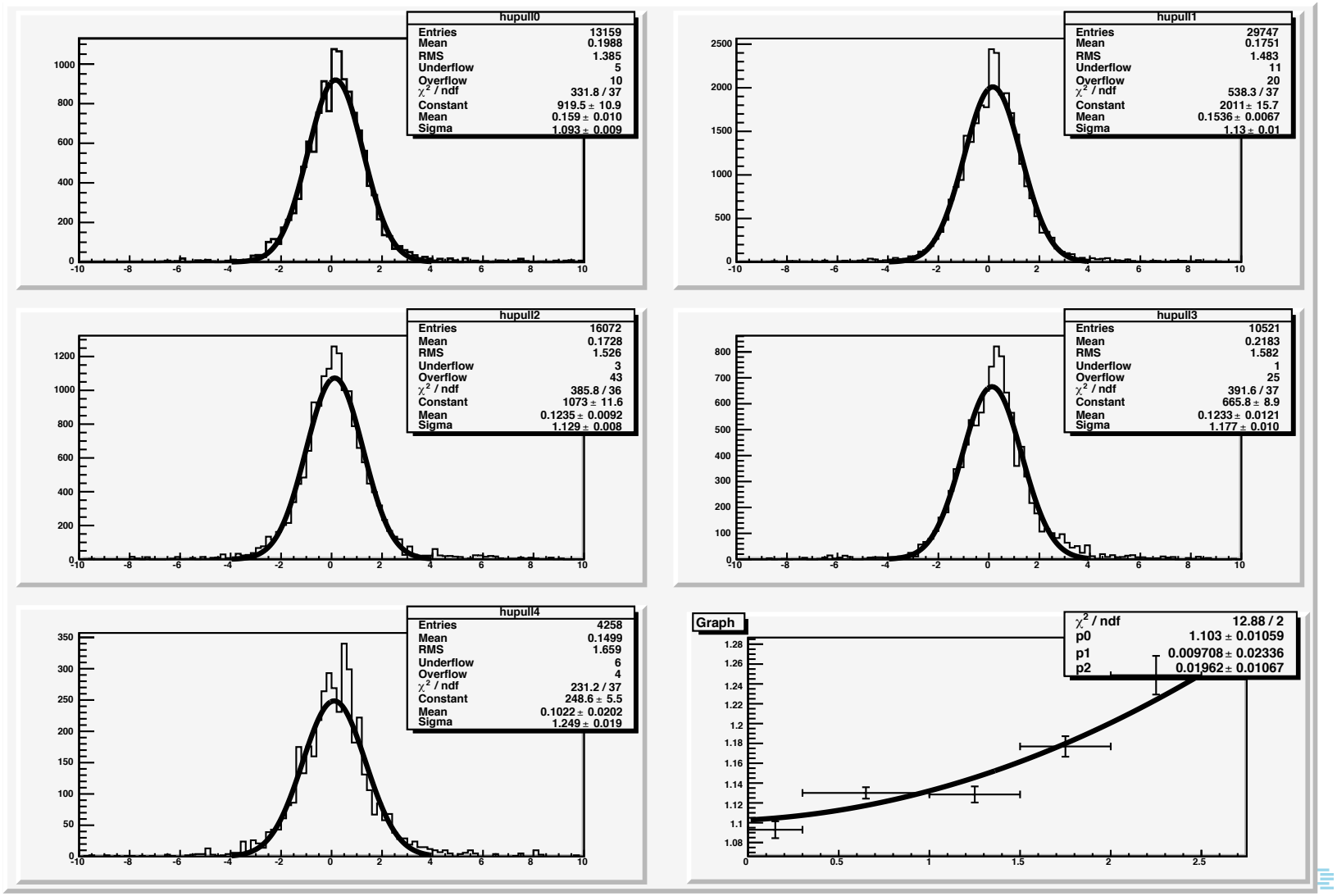
Data/MC comparison of HLT JetProb distributions

- plots in slides 2-3 by Pelle;
- at LVL2 acceptable agreement but distributions are more "b"-like at high eta;
- at EF distributions look similar in all eta windows;
- peak at 1 in EF distributions more pronounced in data.

Closer look to the LVL2 disagreement:
can be due to degradation of track error estimation?

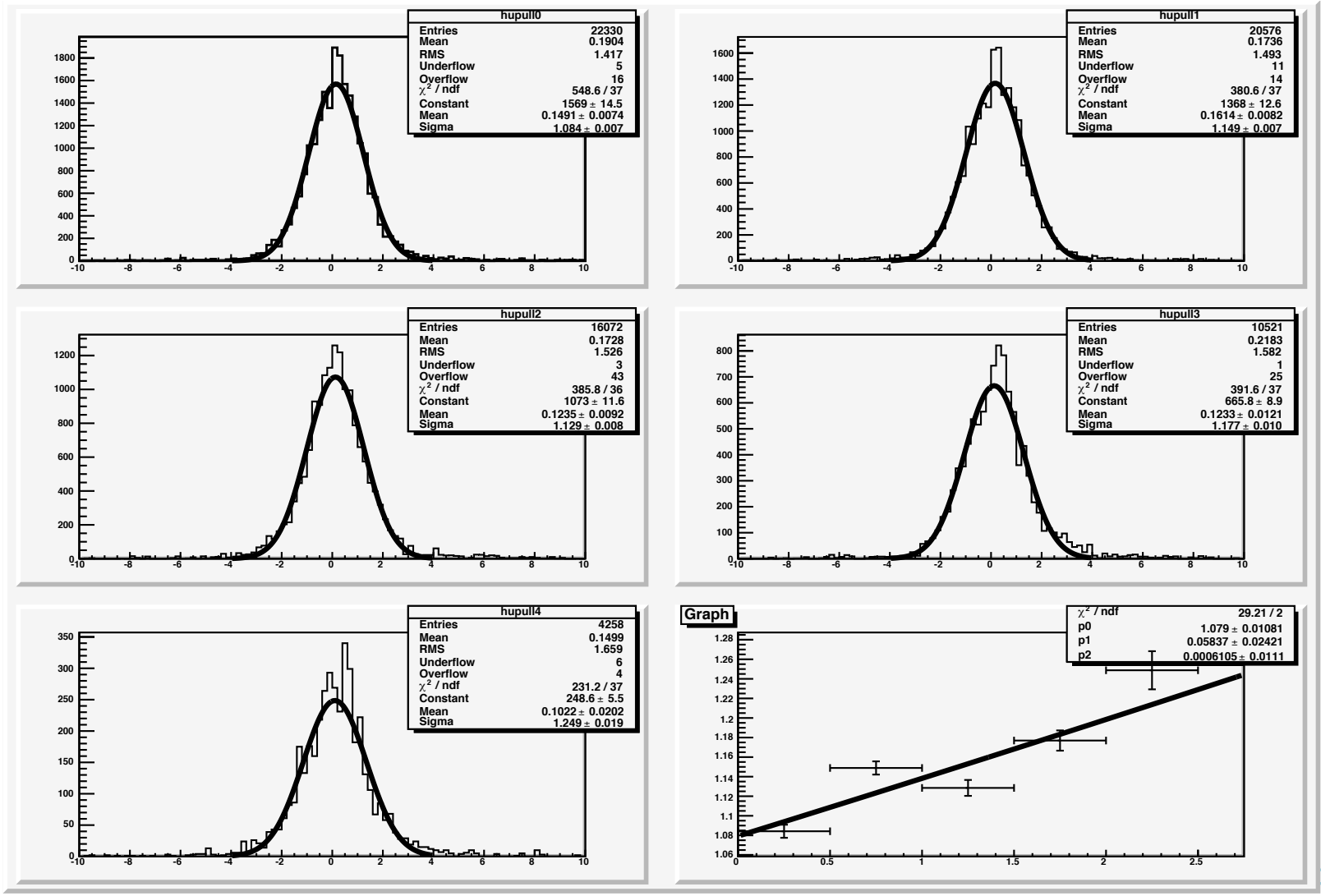
LVL2 d_0 pull distributions in eta bins

Same eta regions then in slides 2-3



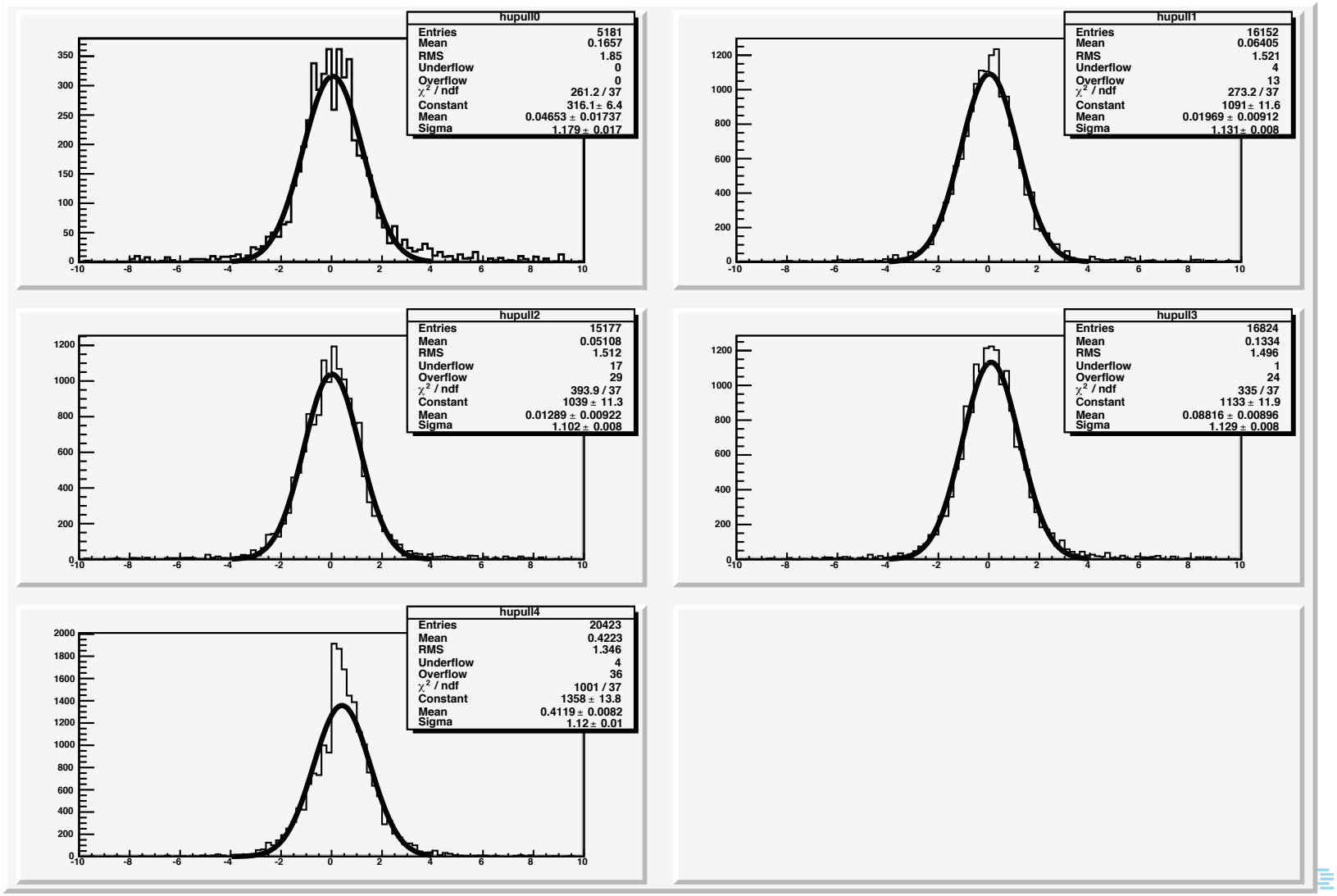
LVL2 d_0 pull distributions in eta bins

Simmetric eta regions (different pol2 fit results)



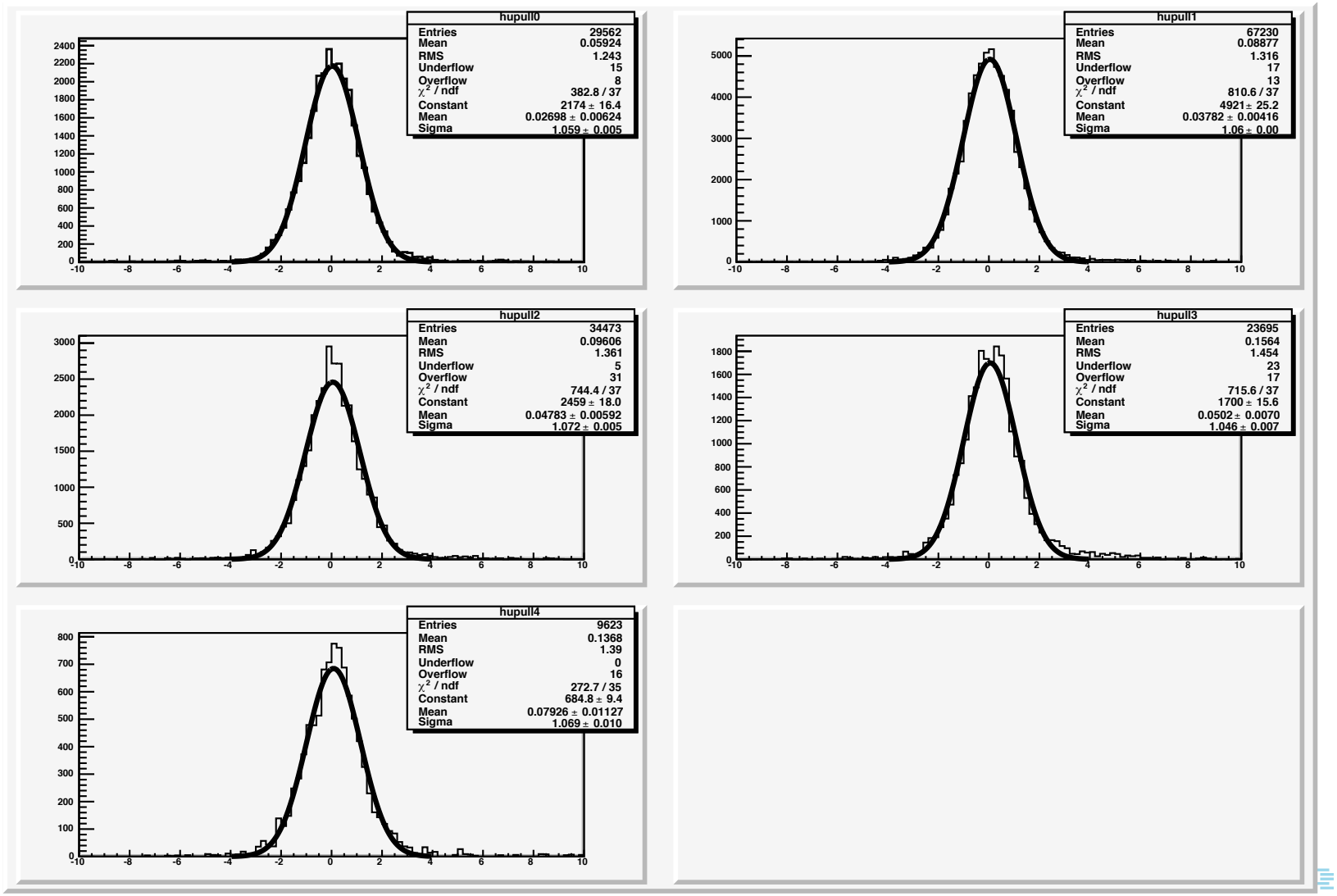
LVL2 d_0 pull distributions in p_T bins

p_T boundary regions: 0, 2, 4, 7, 15 GeV



EF d_0 pull distributions in eta bins

Same eta regions then in slides 2-3

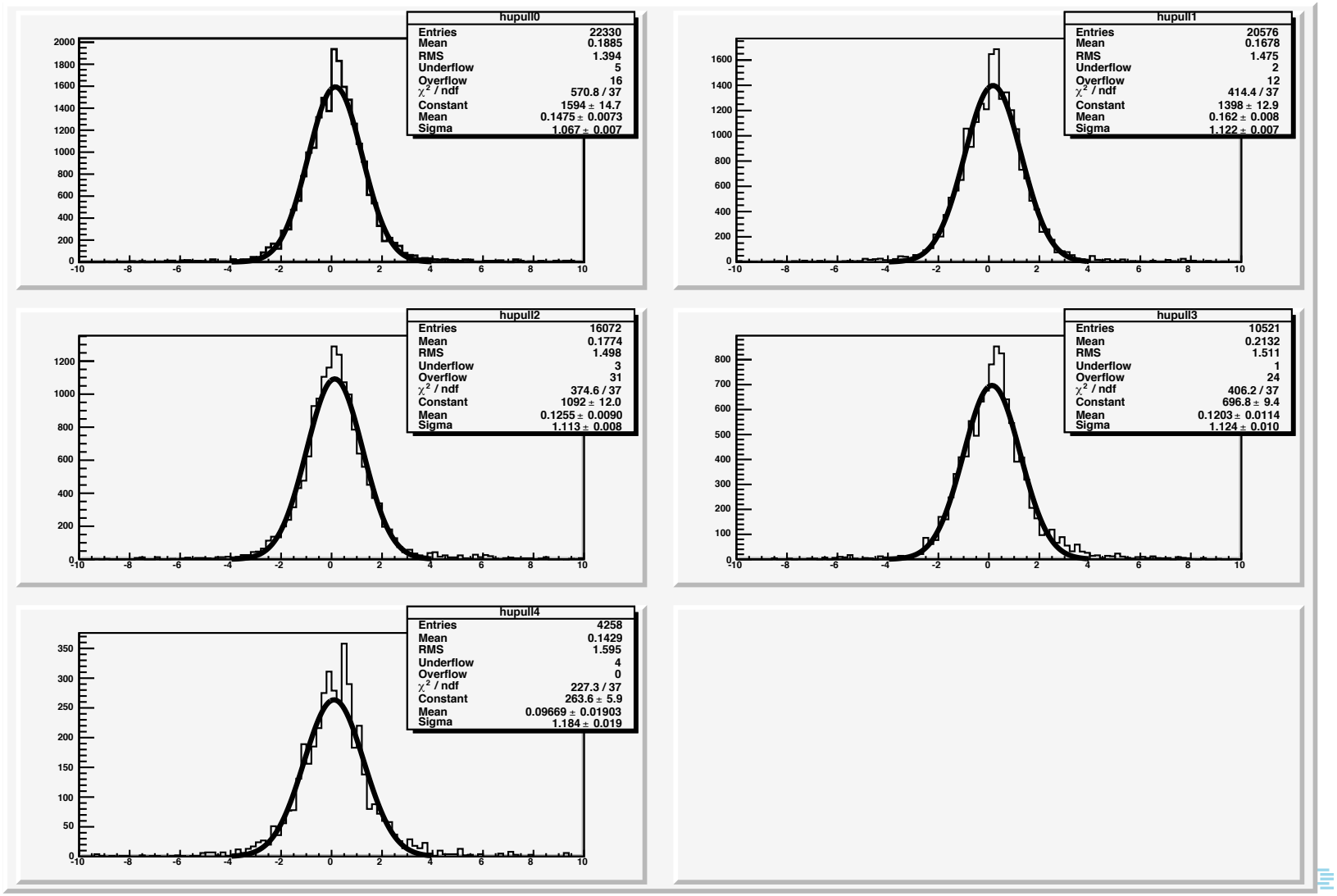


d_0 pull distributions

- pull degradation at high eta is observed at LVL2 and not at EF;
- checked that the pull is not p_T dependent at LVL2;
- a parabola fit is then obtained (fit parameters depend on the eta regions as shown in slides 5-6);
- taking the fit parameters from slide 6 and correcting the d_0 error a posteriori pulls are again studied...
- $p_0 = 1.0793$; $p_1 = 0.0583686$; $p_2 = 0.000610466$;
- new pull sigmas (see slide 10) go in the right direction but no visible gain is obtained in the b-tagging curve (see slide 11);
- Is further investigation needed? Trying other fit procedures? Or eta intervals?

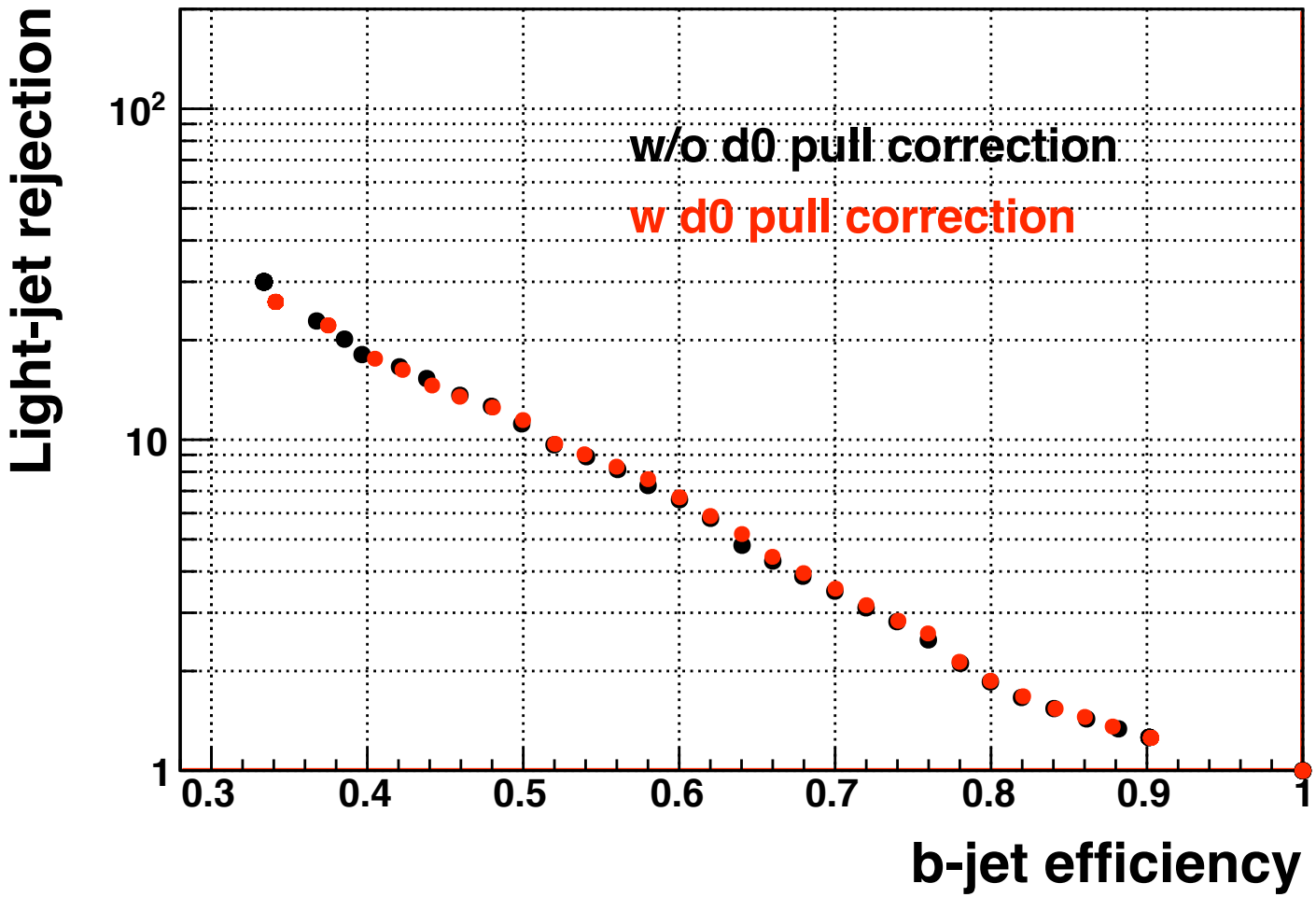
LVL2 d_0 pull distributions in eta bins

After d_0 error correction



LVL2 b-tagging performance

Before and after LVL2 d_0 pull correction

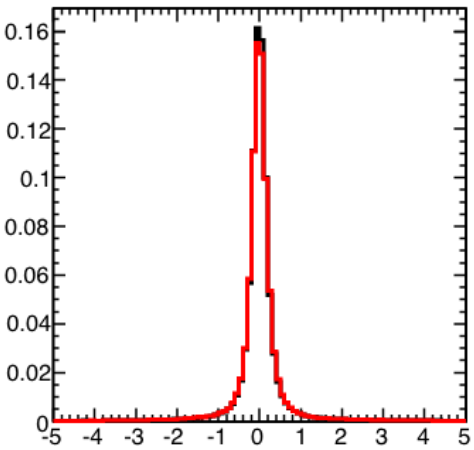


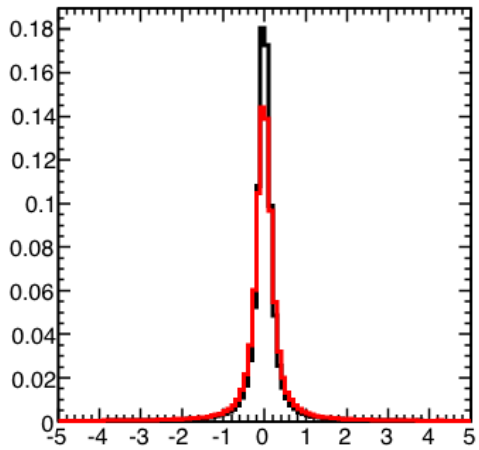
z_0 cut in track selection

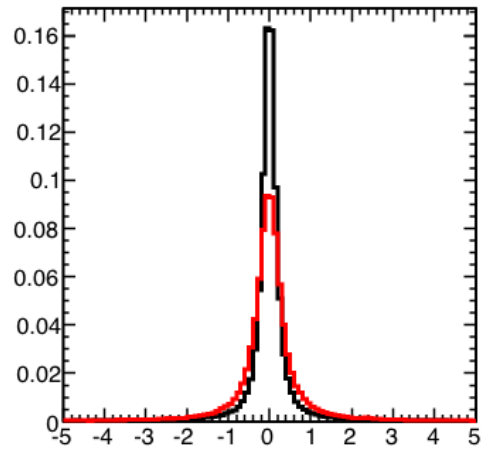
- so far, z_0 and not $z_0 \sin(\theta)$ cut in the track selection;
- this cut is found to be inadequate at high eta (plots by Fabrizio in slide 13);
- b-tagging performance seems to be not particularly sensitive to this modification (slide 14). Probably because of the particular MC sample which not simulates secondary interactions.

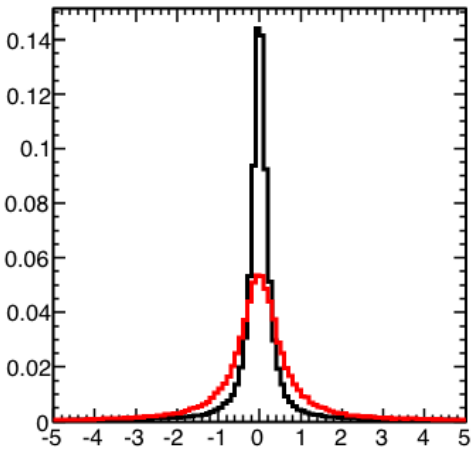
z_0 cut in track selection

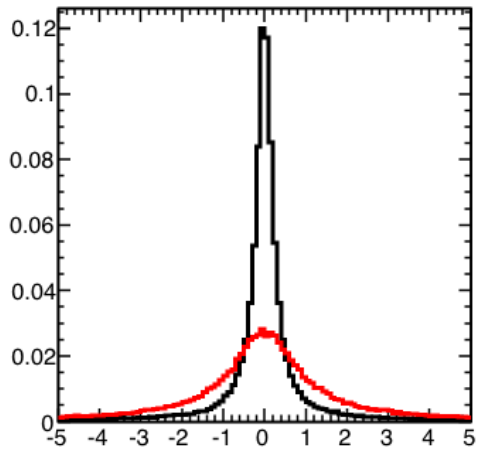
red is Δz, black $\Delta z \sin(theta)$



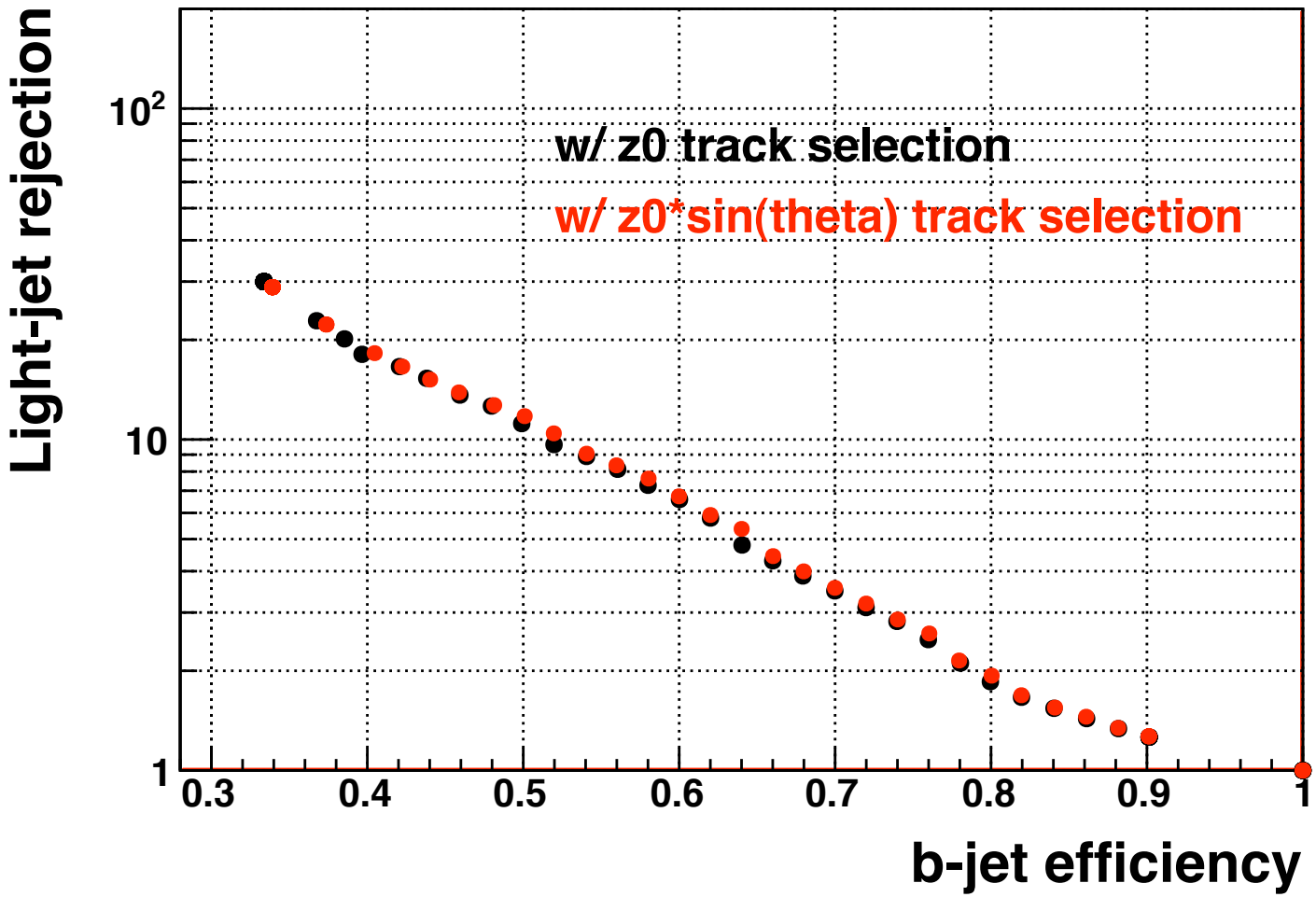








z_0 cut in track selection



Conclusions

Main conclusions:

- LVL2 track d_0 pull deterioration is observed but seems harmless;
- z0*sin(theta) cut needs to be added among the track quality criteria in oder to effectively reject tracks from secondaries at high eta.

Other issues:

- *b*-tagging plots must be re-done with JetProb (coming soon);
- new calibration constants for JetProb;
- peak at 1 in the EF JetProb distributions from data?