

Inclusive $b \rightarrow J/\psi X$: Gen level analysis

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Inclusive b data samples

□ **/BtoJpsiMuMu/Summer08_IDEAL_V9_v1/GEN-SIM-RECO**

18 Sep 2008, 2,033,294 evts, 266 files, 4 blocks, 442.5GB, 2 sites
T2_DE_DESY : dcache-se-cms.desy.de 258,981 56.4GB
T2_DE_RWTH : grid-srm.physik.rwth-aachen.de 1,774,313 386.1GB



CMSSW_2_1_8

Re-production

□ **/JPsi/Summer08_IDEAL_V2_JPsi_v1/RECO**

14 Jul 2008, 1,413,803 evts, 686 files, 7 blocks, 1.4TB, 2 site
NO NAME : cmsdca2.fnal.gov
T1_DE_FZK : gridka-dCache.fzk.de 1,413,803 1.4TB

CMSSW_2_0_9

Ok for use but
waiting for v218

□ **/MuonPT5/CSA08_CSA08_S156_v1/GEN-SIM-RECO**

26 May 2008, 10,398,576 events, 5006 files, 147 blocks, 6.8TB, 3 sites
T1_FR_CCIN2P3 : ccsrm.in2p3.fr 10,398,576 6.8TB
srm.cern.ch 2,188,430 1.4TB
T2_ES_CIEMAT : srm.ciemat.es 10,398,576 6.8TB

CMSSW_2_1_7

Maybe soon RECO
OK, waiting higher
statistic sample

□ **/InclusivePPmuX/Summer08_IDEAL_V9_v1/GEN-SIM-RAW**

24 Sep 2008, 2,511,436 events, 2049 files, 2.4TB, 4 sites

□ **/ppMuX/Summer08_STARTUP_V5_v1/GEN-SIM-RAW**

16 Aug 2008, 2,256,949 events, 1239 files, 14 block(s), 1.8TB, 4 sites

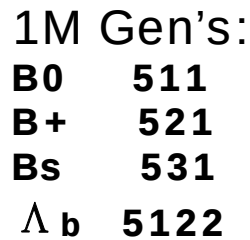
CMSSW_2_1_2

QCD

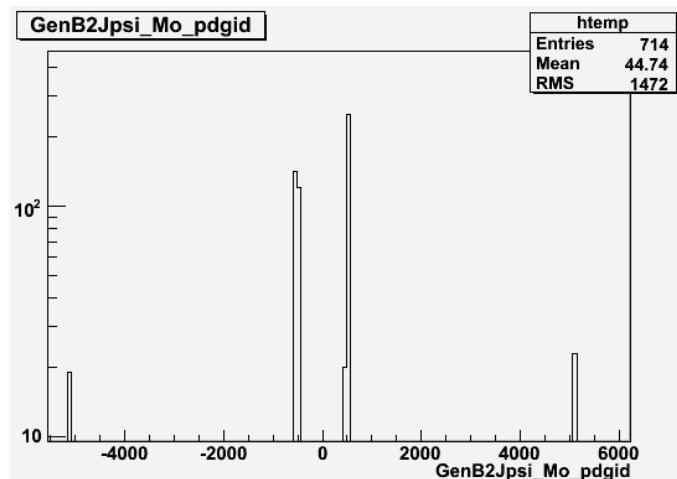
QCD samples for Do

- ❑ **/QCDpt15/Summer08_IDEAL_V9_v1/GEN-SIM-RAW**
04 Sep 2008, contains 7,833,000 evts, 4087 files, 50 blocks, 8.6TB, 8 sites
- ❑ **/QCDpt15/Summer08_IDEAL_V9_v2/GEN-SIM-RAW**
- ❑ 2 Sep 2008, 5,294,700 events, 4979 files, 19 block(s), 5.2TB, 6 sites
- ❑ **/QCDpt15/Summer08_IDEAL_V9_skim_hlt_v1/USER**
07 Sep 2008, 7,757,700 evts, 120 files, 11 blocks, 217.8GB, 1 site
T1_US_FNAL : cmsrm.fnal.gov 7,757,700 217.8GB
- ❑ **/QCDpt30/Summer08_IDEAL_V9_v1/GEN-SIM-RAW**
05 Sep 2008, 3,271,500 evts, 2181 files, 34 block(s), 4.2TB, 3 sites
- ❑ **/QCDpt30/Summer08_IDEAL_V9_skim_hlt_v1/USER**
08 Sep 2008, 3,262,500 evts, 70 files, 9 block(s), 96.0GB, 5 sites
- ❑ **/QCDpt470/Summer08_IDEAL_V9_v1/GEN-SIM-RAW**
12 Sep 2008, 1649376 events, 3818 files, 4.4TB, 5 sites

/BtoJpsiMuMu/Summero8_IDEAL_V9_v1/
Gen OK! So go Re-production!



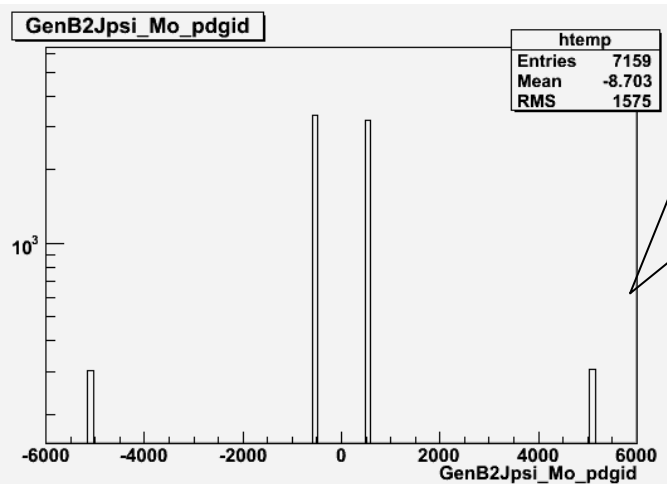
- EvtGen Generator:
10M will for
Gen & Gen+Filter
- Cross-section
 $\sigma_{\text{tot}} * \text{BR}(b \rightarrow J/\psi) * \text{BR}(J/\psi \rightarrow \mu\mu)$
 $= 55 \text{ mb} * 0.0116 * 0.06$
 $= 38.28 \text{ mb}$



Subprocess	Number of points	Sigma		
		(mb)		
No	Type	Generated	Tried	
0	All included subprocesses	1000000	34306155	5.156E+01
11	$f + f' \rightarrow f + f'$ (QCD)	217690	0	1.122E+01
12	$f + \bar{f} \rightarrow f' + \bar{f}'$	193	0	9.952E-03
13	$f + \bar{f} \rightarrow g + g$	153	0	7.889E-03
28	$f + g \rightarrow f + g$	207571	0	1.070E+01
53	$g + g \rightarrow f + \bar{f}$	12750	0	6.574E-01
68	$g + g \rightarrow g + g$	561643	0	2.896E+01
95	Low-pT scattering	0	1002818	0.000E+00

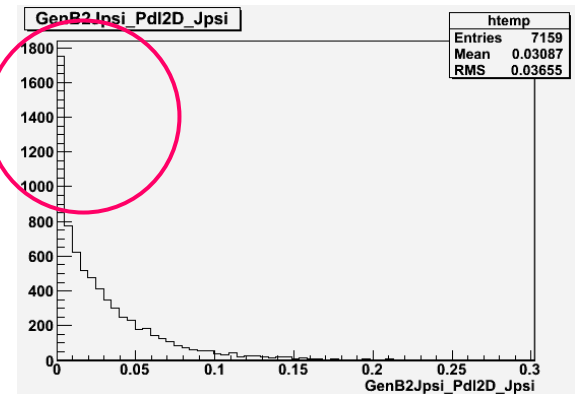
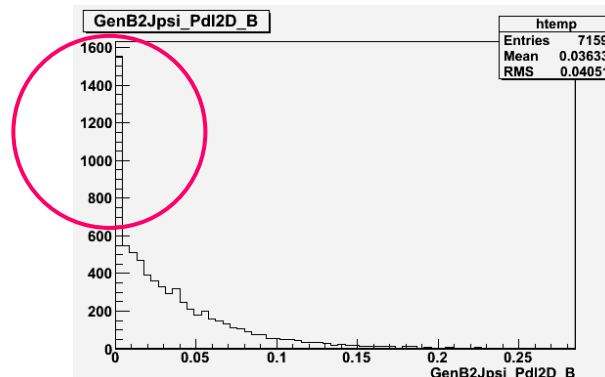
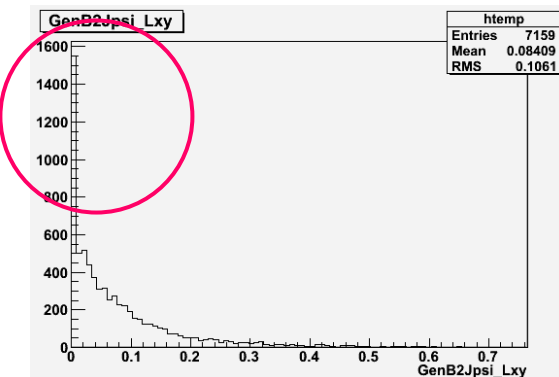
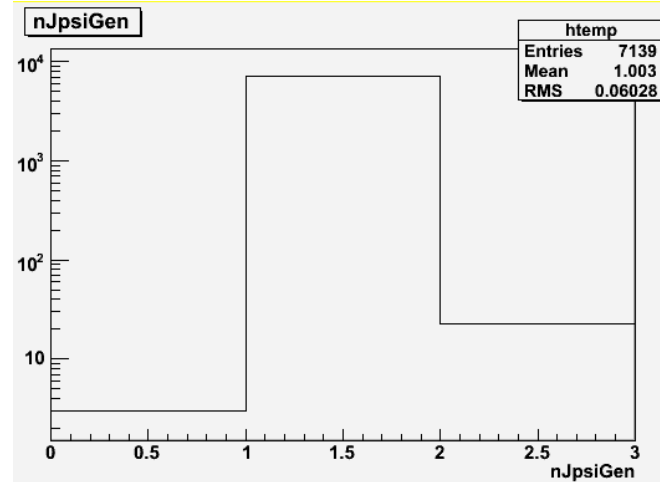
Gen pdg_id & Lxy, Pdl_B & Pdl_jpsi

•Jpsi -> (...) -> b hadrons



10M Gen's:

B0 511
B+ 521
Bs 531
 Λ_b 5122



Inclusive b EvtGen Production

•EvtGen Generator:
10M will for
Gen & Gen+Filter
•Cross-section
 $\sigma(\text{tot}) * \text{BR}(b \rightarrow J/\psi) * \text{BR}(J/\psi \rightarrow \mu\mu)$
 $= 51.56 \text{ mb} * 0.0116 * 0.06$
 $= 35.886 \text{ mb}$

`filterEfficiency = cms.untracked.double(0.000644)`
`crossSection = cms.untracked.double(38280000)`

```
> Evts generated: 10,000,000
> Evts after filter: 7139
> b and jpsi gened @same point /total
> B0          250/ 1357
> anti-B0     282/ 1480
> B+          0/ 1464
> B-          0/ 1450
> B_s0        192/ 383
> anti-B_s0   203/ 415
> Lambda_b0   0/ 306
> anti-Lambda_b0 0/ 304
> -----
> > jpsi/evt, total 7159
> 0, 3
> 1, 7113
> 2, 23
```

? 2

? 1

actually it is a problem I asked myself a lot of times, I don't have a good solution for this. What we do in LHCb is that we generate B+ and Lambda_b0 separatly and then we reweight each sample. But it is not perfect since in Lambda_b0 sample, you have B+ -> Jpsi X coming from the other b quark of the event, then the proportion of B+ -> Jpsi X in the sample is not the one you would like to have

This might be due to a convention of EvtGen for mixing. What EvtGen does is a time-dependent calculation of the mixing probability, but when it has decided if the meson has mixed or not (say yes), the flavor is changed just at the ENDING vertex. E.g. B0 -> (flies for ~1.5 ps) -> B0bar -> (immediately) -> J/psi X. Since the only experimental observable is the final flavor this does no affect at all the physics.

[Patrick Robbe](#) LHCb EvtGenLHC
[Roberto Covarelli](#) CMS EvtGen
[Sarah Dambach](#) CMS EvtGen